

# paper board packaging

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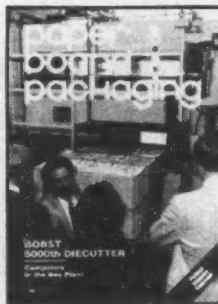
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Pullout  
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vol 67 no. 12

**December 1982**

**(HBJ)** A HARDCOURT BRACE JOVANOVICH PUBLICATION



### on the cover

Bobst recently celebrated the sale of its 5000th Autoplaten® Diecutter to Simkins Industries, Inc., New Haven, Ct. Paperboard Packaging went to New Haven to witness a truly historic event. Story begins on page 18. Cover photo from Fletcher-Walker-Gessell, Inc.

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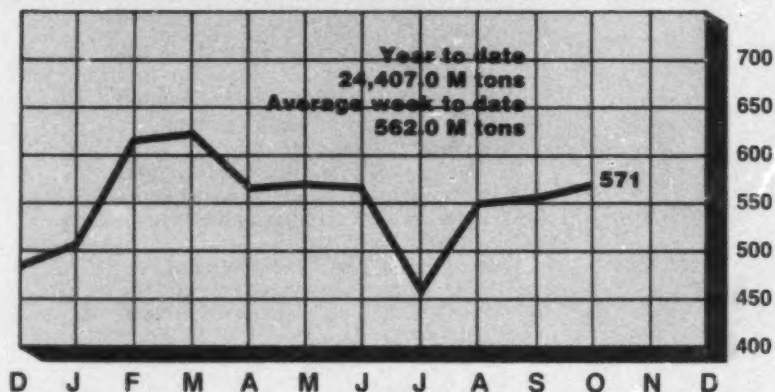
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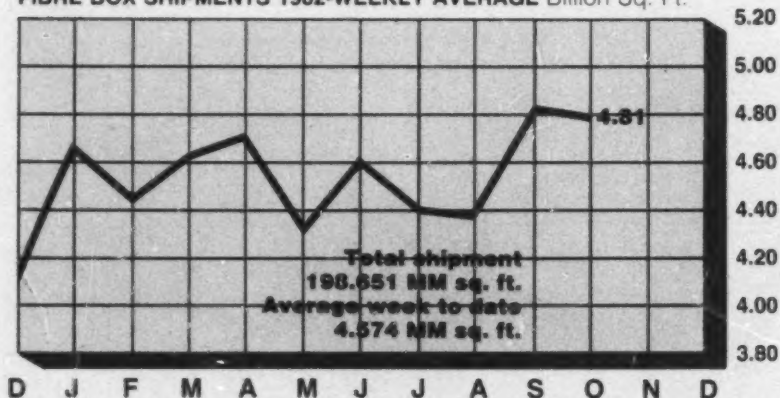
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

The first ten months of 1982 ended with total average-week board volume down 9% from last year, compared with a 3.4% rise in 1981 from '80, which was 1.2% down from '79, which had been 3.5% up from '78. October-end tonnage in '81 was history's highest. However, this recession began with that fourth quarter, and the year's final volume fell below the 1979 record high. Now, two factors are narrowing the tonnage decline from last year. One is the comparison with a recession late-month '81. The other is widening box-plant strikes in east Canada, with many across-border orders improving our board consumption.

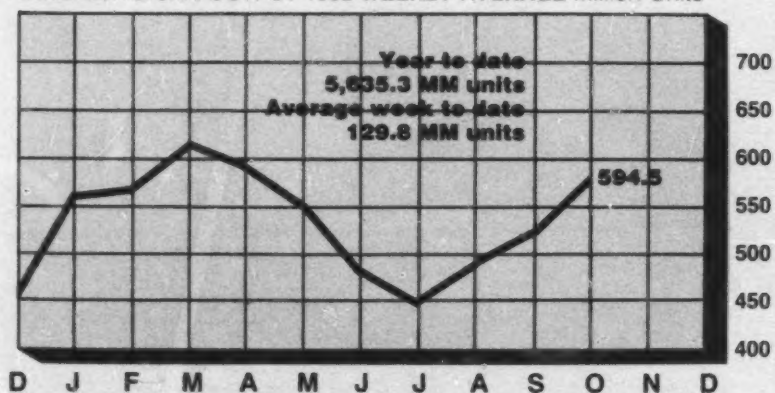
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

In October, 2526.8 M tons of board output (down 5% from '81) comprised 1852.1 M of containerboards (down 6.4%) and 674.7 M of boxboards (down 1.4%), as projected from the American Paper Institute's "production by furnish" data. This relative rise in boxboard volume follows a nine-month stagnation in which the containerboards, though weak themselves, had reached a distorted tonnage ratio of nearly 3-to-1. October provided the best average-week boxboard production of this year, possibly presaging an upturn in markets for retail commodities.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Set-up box billings, more than 7% below the 1981 level, continue to reflect the general industry downturn. However, this record, as reported by about 100 major producers, reflects an average of the nation's most remarkable geographic variations. Business for the year ranges from modest improvements in Midwest and Southern sectors to double-digit drops in the Northeast. Some portion of the advances may be due to higher unit prices, similar to those of the average shipped ton of folding cartons, which continues to improve by around 10%-12% per year.



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1983  
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Forecast

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vol 68 no. 1

# January 1983

**HRJ** A HARCOURT BRACE JOVANOVIĆ PUBLICATION



## on the cover

*Paperboard Packaging* looks down the road to forecast equipment buying trends and what's in store for the corrugated, folding carton and rigid box industries in 1983. Forecast starts on page 18. Cover design by Mary Hessing. Cover photograph by Dick Brockman.

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\*International Edition

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March: Flexo Plates

April: AICC Man of the Year Award

Folding Carton Competition Results

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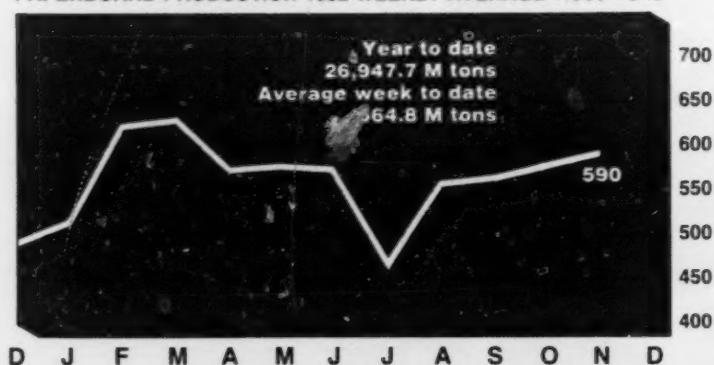
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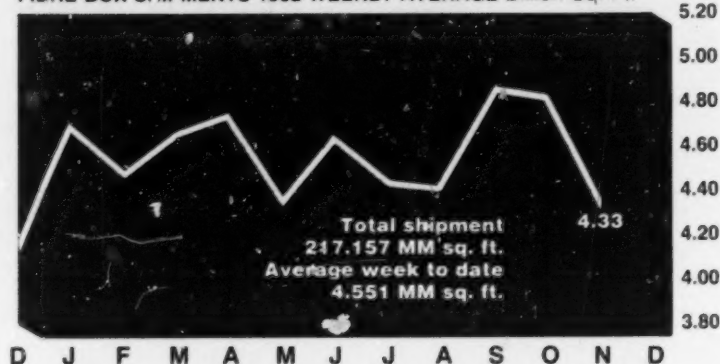
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

With a single month of 1982 remaining, total average week paperboard output was 7.9% below '81, compared with a rise last year of 3% from '80, a drop of 1.9% in '80 from '79, and a rise in '79 of 3.5% from '78. Average week tonnage at November-end is the lowest since 1977. The '82 record includes a reduction of 8.8% in container-boards and of 6.9% in boxboards. The latter grades, of course, had less far to fall, having been in a relatively dismal state for some years. Some small upturn has appeared in latest months; the extent is not evident.

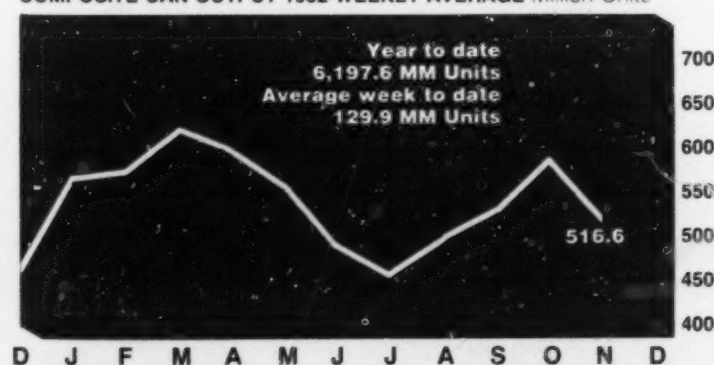
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

In November, 1856.3 M tons of containerboards (up 1.4% from '81!) and 670.9 M of boxboards (down 1%) combined for a 1% overall rise, as projected from the American Paper Institute's "production by furnish" data. One effect of this late-year trend is that the c'board/boxboard ratio is turning toward the traditional 2-to-1 from the near 3-to-1 approached earlier. However, this does not presage any long-term improvement in boxboard fortunes, since at November end their tonnage was the lowest since 1973.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Through the first 11 months of 1982, set-up box producers reported a decline of some 7% from last year's grand total billings, though with decreasing margins as 1981 business slackened in the later months. Only two of the eight National Paperbox & Packaging area divisions remained above the billings of 1981, with the "minuses" no longer restricted to the beset Midwest automotive sectors. The good news is that average value per shipped ton is up 9% in the year; the bad news is that even this gain has barely kept up with inflation.

# 1983 Buying Forecast

*Only a few rays of sunshine  
will break through dark economic clouds*

What do converters in the corrugated and solid fiber sectors have to look forward to in 1983? We wish we could paint a rosy picture filled with words like "upturn," "increases," and "gains," but although such talk could very well start creeping into our vocabulary six months from now, to use them at the start of this new year would only be blowing so much hot air.

A year ago at this time we were predicting an upturn in the latter half of 1982. Needless to say, even the personal tax cut last July did not help the economy turn around. The

key question that everyone has been asking is: What is delaying the recovery?

According to Lawrence Chemerine of Chase Econometrics, a number of factors are to blame. First, companies are still trying to bring down their labor (and other) costs to restore profitability and compete effectively. Second, consumers are showing few signs of wanting to open their wallets and purses on a consistent basis. The *Wall Street Journal* summed this sentiment up nicely in a recent article headlined, "Fearing Loss of Jobs, Many Consumers Cut Pur-

chases, Save More." Even though the average household is in relatively strong financial shape (real income rose 2% in the past 16 months and installment debt as a percentage of disposable income is at a 10-year low) pessimistic consumers are just not likely to go on the kind of spending spree that has lifted the economy out of past recessions. That,

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**What the cloud of uncertainty hanging over the industry means for boxmakers can be summed up in two words: fierce competition.**

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Unfortunately, is going to come about slowly in 1983.

Finally, both households and businesses are not reacting quickly to declines in nominal interest rates. Why? Because these rates, after adjustment for inflation, remain high.

### Reasons for optimism

Nevertheless, there are good reasons for optimism in the converting industry this year. Probably the most significant one is the news that after four years of steady declines, the housing industry is gearing for a modest recovery due to an interest rate decline of more than four percentage points since mid-July. Although it remains to be seen if housing will be leading the parade out of the recession, this is encouraging news to converters since the materials involved in building a house need packaging.

What the cloud of uncertainty hanging over the industry means for boxmakers can be summed up in two words: fierce competition. There will be competition in sales, marketing strategy, production levels, services offered, and package design, among other things. Folding carton and corrugated box plants are closing faster than they are opening and we don't see this trend suddenly reversing itself in 1983. Those in charge at integrated and independent plants alike will continue to be forced to make some very hard decisions in the next 12 months and beyond. International Paper's profit margins were reduced in the third quarter of 1982 because of "very competitive pricing in all product lines," according to Edwin A. Gee, chairman and chief executive officer.

The boxmaking industry is in bet-

ter shape than the auto and steel industries. Historically, orders and shipments of corrugated and solid fiber boxes have closely tracked Gross National Product (GNP) and we see the GNP increasing by one to two percent in 1983 after adjusting for inflation. It has been said before but it bears repeating again: The pie has not (and will not) get any bigger. In 1983 boxmakers just can not afford to take the needs of their current customers for granted. They must listen carefully and (if they don't know already) they must learn the importance of specialization and diversification of their product line. The computer age has clearly arrived in our industry and boxmakers who ignore this and don't take the time to look five or even ten years down the road will eventually pay a hefty price.

In talking to those executives with equipment purchasing power, a number note that they have not bought new equipment in years. Yet, simultaneously, they quickly point out that once they see a steady flow of positive economic signs, funds that had been slowly accumulating will slowly be spent on improving and buying new converting equipment. The latter part of this year will see the beginning of this extremely encouraging development.

## Corrugated Boxmakers Face Tough Decisions in '83

Converters must distinguish between beneficial cost-cutting and plain distress.

**P**aperboard Packaging does not see 1983 being much different from 1982. Whether one looks at industry shipments of corrugated and solid fiber products, consumption of containerboard or inventory of

*This '83 Forecast was written by Mark Arzoumanian, editor; Fred Sharring, senior editor; and Norm Baldwin, executive director, N.P. & P.A.*

containerboard in both box plants and mills, a consistent downward trend prevails. To give one example, shipments in the third quarter in 1982 were 4.9% lower than the same quarter in 1981, according to the Fibre Box Association.

During 1982 the level of corrugated and solid fiber shipments totaled an estimated 240 billion sq ft. In 1981 this figure was 246 billion sq ft, which amounts to a 3% drop between '81 and '82. Shipments in 1983 should equal or slightly surpass those in 1981.

Paperboard Packaging estimates a 1983 sales volume of \$11.3 billion (in today's dollars).

Encouraging news can be found in the gradual decrease in containerboard inventories during 1982, which went from a 9.4 week supply in January to less than a seven week supply by year's end, according to the Bureau of Industrial Economics. The latter is traditionally where inventory supply weeks in the industry have hovered. If packaging demand is going to pick up this year, these figures must stabilize at six to 6.5 week levels.

### Continued computerization

Trends that will continue to have a marked impact on the corrugated industry include the steady growth (from 1960 to 1982: 5.4% to around 9%) of doublewall and triplewall boxes, mainly due to strength and reusability (although singlewall boxes still account for around 91% of the industry's annual container sales); a rise in the number of small sheet plants; continued computerization of the box plant (see last month's article by Steven Kish of Ward Machinery Co. on this subject); using corrugated board with such flexible packaging materials as plastics and film (a trend that is well developed in Europe); and the increased use of protective corrugated sheets made of fluted and laminated paperboard.

Another very hot subject that a lot of people are buzzing about and gathering information on is pre-printed linerboard. According to a knowledgeable industry source directly involved in this topic there were no technological changes in 1982 but a "quantum jump in the awareness of the technology currently available."

"Now large integrated plants and  
(continued on page 22)

Paperboard Packaging / January 1983 / 19

For more information on International Paper Box Machine Co. Circle No. 126 on Reader Inquiry Card ➔



## '83 Forecast

continued from page 19

### Corrugated and Solid Fiber Boxes (SIC 2653): Trends and Projections 1972-83

(in millions of dollars except as noted)

| Item                                                  | 1972               | 1977    | 1979    | 1980    | 1982 <sup>1</sup> | 1982 <sup>2</sup> | Compound<br>annual<br>rate of<br>growth<br>1972-82 | 1983 <sup>3</sup> | Percent<br>change<br>1982-83 <sup>3</sup> |
|-------------------------------------------------------|--------------------|---------|---------|---------|-------------------|-------------------|----------------------------------------------------|-------------------|-------------------------------------------|
| <b>Industry data</b>                                  |                    |         |         |         |                   |                   |                                                    |                   |                                           |
| Value of shipments <sup>4</sup>                       | 4,308.8            | 7,351.1 | 8,975.9 | 9,650.5 | 10,663.8          | 10,983.7          | —                                                  | —                 | —                                         |
| Value of shipments (1972 \$) <sup>4</sup>             | 4,308.8            | 4,619.0 | 5,094.8 | 4,906.3 | 5,004.4           | 4,855.0           | +1.2                                               | 5,000.0           | +3.0                                      |
| Total employment (000)                                | 107.9              | 101.5   | 103.7   | 97.2    | 96.4              | 92.0              | 1.6                                                | 96.0              | +4.3                                      |
| Production workers (000)                              | 80.6               | 73.5    | 75.5    | 69.4    | 68.9              | 65.3              | -2.1                                               | 68.3              | +4.6                                      |
| Average hourly earnings of<br>production workers (\$) | 3.88               | 5.92    | 6.91    | 7.59    | 8.29              | 9.07              | +8.9                                               | —                 | —                                         |
| Capital expenditures                                  | 101.5              | 243.3   | 303.0   | 432.8   | —                 | —                 | —                                                  | —                 | —                                         |
| <b>Product data</b>                                   |                    |         |         |         |                   |                   |                                                    |                   |                                           |
| Value of shipments <sup>4</sup>                       | 4,196.9            | 7,182.8 | 8,686.9 | 9,363.5 | 10,346.7          | 10,657.1          | —                                                  | —                 | —                                         |
| Value of shipments (1972 \$) <sup>4</sup>             | 4,196.9            | 4,499.1 | 4,962.5 | 4,778.9 | 4,874.5           | 4,728.3           | +1.2                                               | 4,870.1           | +3.0                                      |
| Product price index (1972 = 100)                      | 100.0              | 146.4   | 173.1   | 194.6   | 211.1             | 223.8             | —                                                  | —                 | —                                         |
| Quantity shipped (unit of measure)                    | 211.9              | 227.2   | 250.6   | 244.4   | 246.2             | 238.8             | +1.2                                               | 246.0             | +3.0                                      |
| <b>Trade</b>                                          |                    |         |         |         |                   |                   |                                                    |                   |                                           |
| Value of exports                                      | 8.3                | 34.0    | 49.0    | 54.7    | 64.4              | 57.5              | —                                                  | 61.5              | +7.0                                      |
| Export shipments ratio                                | 0.002 <sup>5</sup> | 0.005   | 0.006   | 0.006   | 0.006             | 0.005             | —                                                  | —                 | —                                         |

<sup>1</sup> Estimated except for product price index, exports, and imports

<sup>2</sup> Estimated.

<sup>3</sup> Forecast.

<sup>4</sup> Value of all products and service sold by industry SIC 2653.

<sup>5</sup> Value of shipments of corrugated and solid fiber box products produced by all industries.

<sup>6</sup> New supply is the sum of product shipments plus imports.

Source: Bureau of the Census and Bureau of Industrial Economics. Estimates and forecasts by the Bureau of Industrial Economics.

independents alike are seriously looking at it as something to be included in their capital plans. The market (for preprinted linerboard) will experience geometric growth and will surpass capacity quickly. In 1983 you'll see purchases of new equipment to fill this need."

One of the major challenges that converters in the corrugated industry must face up to is the need to lower their break-even points by closely examining such overhead costs as interest expense, depreciation and the cost of administrative, sales and other personnel not directly involved in the production process. The inevitable paring down will not be pleasant but must be faced squarely in times when survival is the name of the game.

#### Significant gains

More encouraging news is found in the recently released report of the Conference Board's Labor Outlook Panel. It notes that a recovery in

production levels because of a "thinned-out" labor force could "yield significant productivity gains."

There is still controversy over the Occupational Safety and Health

#### A recovery in production levels because of a "thinned-out" labor force could "yield significant productivity gains."

Administration's methods, and emotions are still aroused whenever OSHA even mentions possible changes in the standards that protect workers from hazards, but big industry now cheers more often than it complains.

The corrugated industry in Canada was hit (in its Eastern region only) by a strike in July that for the most part has now been settled. For many Northern U.S. plants this provided

them with a temporary windfall. Paperboard Packaging sees no spectacular growth in containerboard production in Canada this year; perhaps 2% at the most.

In Western Europe, gains for corrugated end of line packaging materials are projected at just 0.5% per year. Sales are seen inching up to \$3.74 billion in 1980 from \$3.55 billion by 1987, while usage builds to 5.56 million tons from 5.28 million.

Corrugated products, which had a 97% share of the Western European market in 1980, will see their portion decline to 96% in 1987 in terms of tonnage. Dollar share for corrugated products is forecast to slip to 91% in 1987 from 93% in 1980, according to Frost & Sullivan, Inc.

Because corrugated products in Western Europe have such a large share of the market, machinery investment in this area will continue to be a major factor for the packaging industry, as will investments in pallet-packing equipment.

# '83 Forecast

continued

The "MAJOR EQUIPMENT" figures used in this buying forecast are computer tabulated and based on the responses to questionnaires sent out to box plants in compiling the Fall 1982 Official Container Directory.



DELAWARE  
DISTRICT OF COLUMBIA  
FLORIDA  
GEORGIA  
MARYLAND  
NORTH CAROLINA  
PUERTO RICO  
SOUTH CAROLINA  
VIRGINIA  
WEST VIRGINIA



NEW JERSEY  
NEW YORK  
PENNSYLVANIA

## Total United States

### Major Equipment

|                                                          |      |
|----------------------------------------------------------|------|
| Total number of corrugating and sheet plants .....       | 1342 |
| Corrugators .....                                        | 612  |
| Independent single facers .....                          | 95   |
| Letterpress printer-sloters .....                        | 2221 |
| Flexographic printer-sloters .....                       | 779  |
| Flexographic printing folder-glueers .....               | 1081 |
| Folder-glueers .....                                     | 1038 |
| Infold-glueers .....                                     | 76   |
| Tapers & folder tapers .....                             | 1989 |
| Folder stitchers and stitchers .....                     | 1512 |
| Diecutters, platen jaw type .....                        | 645  |
| Diecutters, flat bed reciprocating .....                 | 1001 |
| Diecutter stations, rotary .....                         | 686  |
| Wax impregnators, and other coaters on corrugators ..... | 194  |
| Curtain coaters .....                                    | 216  |
| Laminators .....                                         | 483  |
| Unitizers and load strappers .....                       | 1149 |
| Bundle tyers .....                                       | 1565 |
| Computers .....                                          | 583  |

### Estimated Expenditures

#### Materials

|                                             |               |
|---------------------------------------------|---------------|
| Corrugating adhesives .....                 | \$106,856,000 |
| Printing inks .....                         | 87,318,000    |
| Waxes and coatings .....                    | 94,368,000    |
| Adhesives, including synthetic resins ..... | 15,936,000    |
| Jointing tapes .....                        | 25,440,000    |
| Stitch wire and staples .....               | 6,528,000     |

#### Supplies

|                                    |            |
|------------------------------------|------------|
| Printing plates and dies .....     | 47,872,000 |
| Cutting rule and dies .....        | 35,360,000 |
| Pallet materials .....             | 28,992,000 |
| Twine .....                        | 5,088,000  |
| Strapping: steel and plastic ..... | 20,352,000 |
| Baling supplies .....              | 2,208,000  |
| Oil and lubricants .....           | 10,176,000 |
| Maintenance supplies .....         | 26,112,000 |

## South Atlantic

### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 175 |
| Corrugators .....                                        | 85  |
| Independent single facers .....                          | 8   |
| Letterpress printer-sloters .....                        | 283 |
| Flexographic printer-sloters .....                       | 138 |
| Flexographic printing folder-glueers .....               | 149 |
| Folder-glueers .....                                     | 141 |
| Infold-glueers .....                                     | 3   |
| Tapers & folder tapers .....                             | 276 |
| Folder stitchers and stitchers .....                     | 198 |
| Diecutters, platen jaw type .....                        | 56  |
| Diecutters, flat bed reciprocating .....                 | 97  |
| Diecutter stations, rotary .....                         | 95  |
| Wax impregnators, and other coaters on corrugators ..... | 32  |
| Curtain coaters .....                                    | 33  |
| Laminators .....                                         | 41  |
| Unitizers and load strappers .....                       | 155 |
| Bundle tyers .....                                       | 187 |
| Computers .....                                          | 63  |

### Estimated Expenditures

#### Materials

|                                             |              |
|---------------------------------------------|--------------|
| Corrugating adhesives .....                 | \$16,439,100 |
| Printing inks .....                         | 12,858,230   |
| Waxes and coatings .....                    | 16,327,680   |
| Adhesives, including synthetic resins ..... | 2,248,320    |
| Jointing tapes .....                        | 3,479,040    |
| Stitch wire and staples .....               | 965,760      |

#### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 8,164,640 |
| Cutting rule and dies .....        | 3,670,300 |
| Pallet materials .....             | 4,460,160 |
| Twine .....                        | 630,720   |
| Strapping: steel and plastic ..... | 2,934,720 |
| Baling supplies .....              | 339,648   |
| Oil and lubricants .....           | 1,565,472 |
| Maintenance supplies .....         | 4,017,600 |

## Middle Atlantic

### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 249 |
| Corrugators .....                                        | 115 |
| Independent single facers .....                          | 25  |
| Letterpress printer-sloters .....                        | 450 |
| Flexographic printer-sloters .....                       | 133 |
| Flexographic printing folder-glueers .....               | 187 |
| Folder-glueers .....                                     | 163 |
| Infold-glueers .....                                     | 14  |
| Tapers & folder tapers .....                             | 392 |
| Folder stitchers and stitchers .....                     | 280 |
| Diecutters, platen jaw type .....                        | 118 |
| Diecutters, flat bed reciprocating .....                 | 232 |
| Diecutter stations, rotary .....                         | 121 |
| Wax impregnators, and other coaters on corrugators ..... | 29  |
| Curtain coaters .....                                    | 26  |
| Laminators .....                                         | 103 |
| Unitizers and load strappers .....                       | 191 |
| Bundle tyers .....                                       | 247 |
| Computers .....                                          | 94  |

### Estimated expenditures

#### Materials

|                                             |              |
|---------------------------------------------|--------------|
| Corrugating adhesives .....                 | \$20,035,500 |
| Printing inks .....                         | 16,555,770   |
| Waxes and coatings .....                    | 12,591,360   |
| Adhesives, including synthetic resins ..... | 2,937,600    |
| Jointing tapes .....                        | 4,798,080    |
| Stitch wire and staples .....               | 1,234,560    |

#### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 8,324,360 |
| Cutting rule and dies .....        | 7,109,400 |
| Pallet materials .....             | 5,435,520 |
| Twine .....                        | 829,440   |
| Strapping: steel and plastic ..... | 3,610,560 |
| Baling supplies .....              | 413,952   |
| Oil and lubricants .....           | 1,907,520 |
| Maintenance supplies .....         | 4,896,000 |

## '83 Forecast

continued



### New England

CONNECTICUT  
MAINE  
MASSACHUSETTS  
NEW HAMPSHIRE  
RHODE ISLAND  
VERMONT

#### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 86  |
| Corrugators .....                                        | 36  |
| Independent single facers .....                          | 10  |
| Letterpress printer-sloters .....                        | 141 |
| Flexographic printer-sloters .....                       | 42  |
| Flexographic printing folder-glueers .....               | 55  |
| Folder-glueers .....                                     | 46  |
| Infold-glueers .....                                     | 3   |
| Tapers & folder tapers .....                             | 151 |
| Folder stitchers and stitchers .....                     | 114 |
| Diecutters, platen jaw type .....                        | 46  |
| Diecutters, flat bed reciprocating .....                 | 90  |
| Diecutter stations, rotary .....                         | 29  |
| Wax impregnators, and other coaters on corrugators ..... | 6   |
| Curtain coaters .....                                    | 3   |
| Laminators .....                                         | 37  |
| Unitizers and load strappers .....                       | 69  |
| Bundle tyers .....                                       | 97  |
| Computers .....                                          | 36  |

#### Estimated Expenditures

##### Materials

|                                             |             |
|---------------------------------------------|-------------|
| Corrugating adhesives .....                 | \$6,849,440 |
| Printing inks .....                         | 5,611,760   |
| Waxes and coatings .....                    | 4,427,520   |
| Adhesives, including synthetic resins ..... | 974,123     |
| Joining tapes .....                         | 1,864,320   |
| Stitch wire and staples .....               | 487,200     |

##### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 3,005,200 |
| Cutting rule and dies .....        | 2,254,200 |
| Pallet materials .....             | 1,857,600 |
| Twine .....                        | 334,080   |
| Strapping: steel and plastic ..... | 2,282,880 |
| Baling supplies .....              | 141,504   |
| Oil and lubricants .....           | 652,320   |
| Maintenance supplies .....         | 1,673,760 |



### East North Central

ILLINOIS  
INDIANA  
MICHIGAN  
OHIO  
WISCONSIN

#### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 382 |
| Corrugators .....                                        | 156 |
| Independent single facers .....                          | 30  |
| Letterpress printer-sloters .....                        | 603 |
| Flexographic printer-sloters .....                       | 175 |
| Flexographic printing folder-glueers .....               | 278 |
| Folder-glueers .....                                     | 228 |
| Infold-glueers .....                                     | 23  |
| Tapers & folder tapers .....                             | 599 |
| Folder stitchers and stitchers .....                     | 429 |
| Diecutters, platen jaw type .....                        | 205 |
| Diecutters, flat bed reciprocating .....                 | 254 |
| Diecutter stations, rotary .....                         | 185 |
| Wax impregnators, and other coaters on corrugators ..... | 30  |
| Curtain coaters .....                                    | 41  |
| Laminators .....                                         | 146 |
| Unitizers and load strappers .....                       | 313 |
| Bundle tyers .....                                       | 425 |
| Computers .....                                          | 141 |

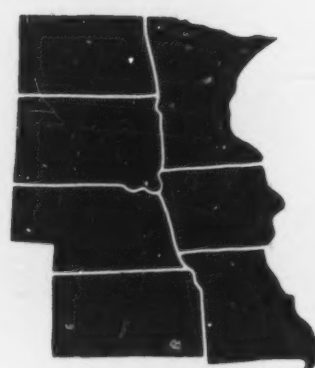
#### Estimated Expenditures

##### Materials

|                                             |              |
|---------------------------------------------|--------------|
| Corrugating adhesives .....                 | \$27,912,800 |
| Printing inks .....                         | 23,436,490   |
| Waxes and coatings .....                    | 21,309,120   |
| Adhesives, including synthetic resins ..... | 4,368,960    |
| Joining tapes .....                         | 7,435,200    |
| Stitch wire and staples .....               | 1,920,000    |

##### Supplies

|                                    |            |
|------------------------------------|------------|
| Printing plates and dies .....     | 11,807,840 |
| Cutting rule and dies .....        | 9,623,700  |
| Pallet materials .....             | 7,573,440  |
| Twine .....                        | 1,376,640  |
| Strapping: steel and plastic ..... | 6,063,360  |
| Baling supplies .....              | 576,960    |
| Oil and lubricants .....           | 2,658,240  |
| Maintenance supplies .....         | 6,820,800  |



### West North Central

IOWA  
KANSAS  
MINNESOTA  
MISSOURI  
NEBRASKA  
NORTH DAKOTA  
SOUTH DAKOTA

#### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 102 |
| Corrugators .....                                        | 48  |
| Independent single facers .....                          | 8   |
| Letterpress printer-sloters .....                        | 170 |
| Flexographic printer-sloters .....                       | 68  |
| Flexographic printing folder-glueers .....               | 80  |
| Folder-glueers .....                                     | 59  |
| Infold-glueers .....                                     | 12  |
| Tapers & folder tapers .....                             | 151 |
| Folder stitchers and stitchers .....                     | 113 |
| Diecutters, platen jaw type .....                        | 33  |
| Diecutters, flat bed reciprocating .....                 | 60  |
| Diecutter stations, rotary .....                         | 69  |
| Wax impregnators, and other coaters on corrugators ..... | 24  |
| Curtain coaters .....                                    | 35  |
| Laminators .....                                         | 36  |
| Unitizers and load strappers .....                       | 107 |
| Bundle tyers .....                                       | 124 |
| Computers .....                                          | 81  |

#### Estimated Expenditures

##### Materials

|                                             |             |
|---------------------------------------------|-------------|
| Corrugating adhesives .....                 | \$6,164,940 |
| Printing inks .....                         | 4,536,840   |
| Waxes and coatings .....                    | 7,056,000   |
| Adhesives, including synthetic resins ..... | 932,527     |
| Joining tapes .....                         | 1,567,680   |
| Stitch wire and staples .....               | 317,760     |

##### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 2,313,520 |
| Cutting rule and dies .....        | 2,283,100 |
| Pallet materials .....             | 1,672,320 |
| Twine .....                        | 327,360   |
| Strapping: steel and plastic ..... | 1,312,992 |
| Baling supplies .....              | 127,392   |
| Oil and lubricants .....           | 587,040   |
| Maintenance supplies .....         | 1,506,240 |

(continued on page 30)



## '83 Forecast

continued from page 26



### East South Central

ALABAMA  
KENTUCKY  
MISSISSIPPI  
TENNESSEE

#### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 77  |
| Corrugators .....                                        | 38  |
| Independent single facers .....                          | 2   |
| Letterpress printer-slotlers .....                       | 142 |
| Flexographic printer-slotlers .....                      | 48  |
| Flexographic printing folder-glueers .....               | 60  |
| Folder-glueers .....                                     | 135 |
| Infold-glueers .....                                     | 6   |
| Tapers & folder tapers .....                             | 135 |
| Folder stitchers and stitchers .....                     | 90  |
| Diecutters, platen jaw type .....                        | 40  |
| Diecutters, flat bed reciprocating .....                 | 56  |
| Diecutter stations, rotary .....                         | 44  |
| Wax impregnators, and other coaters on corrugators ..... | 10  |
| Curtain coaters .....                                    | 15  |
| Laminators .....                                         | 24  |
| Unitizers and load strappers .....                       | 74  |
| Bundle tyers .....                                       | 69  |
| Computers .....                                          | 31  |

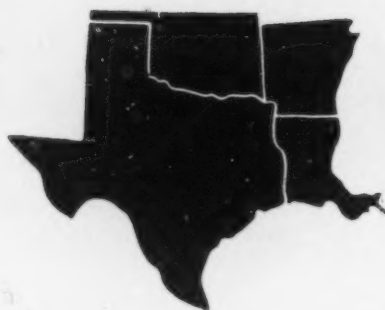
#### Estimated Expenditures

##### Materials

|                                             |             |
|---------------------------------------------|-------------|
| Corrugating adhesives .....                 | \$6,678,500 |
| Printing inks .....                         | 5,633,320   |
| Waxes and coatings .....                    | 6,088,320   |
| Adhesives, including synthetic resins ..... | 1,034,880   |
| Jointing tapes .....                        | 1,591,680   |
| Stitch wire and staples .....               | 404,160     |

##### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 3,058,000 |
| Cutting rule and dies .....        | 2,051,900 |
| Pallet materials .....             | 1,811,520 |
| Twine .....                        | 249,600   |
| Strapping: steel and plastic ..... | 1,390,080 |
| Baling supplies .....              | 137,952   |
| Oil and lubricants .....           | 636,000   |
| Maintenance supplies .....         | 1,632,000 |



### West South Central

ARKANSAS  
LOUISIANA  
MISSISSIPPI  
TEXAS

#### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 103 |
| Corrugators .....                                        | 48  |
| Independent single facers .....                          | 8   |
| Letterpress printer-slotlers .....                       | 170 |
| Flexographic printer-slotlers .....                      | 68  |
| Flexographic printing folder-glueers .....               | 80  |
| Folder-glueers .....                                     | 59  |
| Infold-glueers .....                                     | 12  |
| Tapers & folder tapers .....                             | 151 |
| Folder stitchers and stitchers .....                     | 113 |
| Diecutters, platen jaw type .....                        | 33  |
| Diecutters, flat bed reciprocating .....                 | 60  |
| Diecutter stations, rotary .....                         | 69  |
| Wax impregnators, and other coaters on corrugators ..... | 24  |
| Curtain coaters .....                                    | 35  |
| Laminators .....                                         | 36  |
| Unitizers and load strappers .....                       | 107 |
| Bundle tyers .....                                       | 124 |
| Computers .....                                          | 51  |

#### Estimated Expenditures

##### Materials

|                                             |              |
|---------------------------------------------|--------------|
| Corrugating adhesives .....                 | \$ 9,076,100 |
| Printing inks .....                         | 7,030,870    |
| Waxes and coatings .....                    | 11,484,480   |
| Adhesives, including synthetic resins ..... | 1,238,400    |
| Jointing tapes .....                        | 2,018,880    |
| Stitch wire and staples .....               | 536,640      |

##### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 3,802,480 |
| Cutting rule and dies .....        | 2,658,800 |
| Pallet materials .....             | 2,462,400 |
| Twine .....                        | 434,880   |
| Strapping: steel and plastic ..... | 2,258,880 |
| Baling supplies .....              | 187,200   |
| Oil and lubricants .....           | 864,288   |
| Maintenance supplies .....         | 2,217,600 |



### Mountain

ARIZONA  
COLORADO  
IDAHO  
MONTANA  
NEVADA  
NEW MEXICO  
UTAH  
WYOMING

#### Major Equipment

|                                                          |    |
|----------------------------------------------------------|----|
| Total number of corrugating and sheet plants .....       | 29 |
| Corrugators .....                                        | 10 |
| Independent single facers .....                          | —  |
| Letterpress printer-slotlers .....                       | 37 |
| Flexographic printer-slotlers .....                      | 17 |
| Flexographic printing folder-glueers .....               | 22 |
| Folder-glueers .....                                     | 21 |
| Infold-glueers .....                                     | 2  |
| Tapers & folder tapers .....                             | 39 |
| Folder stitchers and stitchers .....                     | 30 |
| Diecutters, platen jaw type .....                        | 12 |
| Diecutters, flat bed reciprocating .....                 | 20 |
| Diecutter stations, rotary .....                         | 13 |
| Wax impregnators, and other coaters on corrugators ..... | —  |
| Curtain coaters .....                                    | 7  |
| Laminators .....                                         | 10 |
| Unitizers and load strappers .....                       | 17 |
| Bundle tyers .....                                       | 43 |
| Computers .....                                          | 13 |

#### Estimated Expenditures

##### Materials

|                                             |             |
|---------------------------------------------|-------------|
| Corrugating adhesives .....                 | \$1,369,000 |
| Printing inks .....                         | 1,612,380   |
| Waxes and coatings .....                    | 829,440     |
| Adhesives, including synthetic resins ..... | 376,800     |
| Jointing tapes .....                        | 451,296     |
| Stitch wire and staples .....               | 111,360     |

##### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 1,143,560 |
| Cutting rule and dies .....        | 805,375   |
| Pallet materials .....             | 371,520   |
| Twine .....                        | 127,680   |
| Strapping: steel and plastic ..... | 269,760   |
| Baling supplies .....              | 27,840    |
| Oil and lubricants .....           | 130,464   |
| Maintenance supplies .....         | 334,080   |

## '83 Forecast

continued



### Pacific

#### Major Equipment

|                                                          |     |
|----------------------------------------------------------|-----|
| Total number of corrugating and sheet plants .....       | 139 |
| Corrugators .....                                        | 76  |
| Independent single facers .....                          | 4   |
| Letterpress printer-sloters .....                        | 229 |
| Flexographic printer-sloters .....                       | 90  |
| Flexographic printing folder-glueers .....               | 171 |
| Folder-glueers .....                                     | 185 |
| Infold-glueers .....                                     | 1   |
| Tapers & folder tapers .....                             | 195 |
| Folder stitchers and stitchers .....                     | 145 |
| Diecutters, platen jaw type .....                        | 102 |
| Diecutters, flat bed reciprocating .....                 | 132 |
| Diecutter stations, rotary .....                         | 61  |
| Wax impregnators, and other coaters on corrugators ..... | 39  |
| Curtain coaters .....                                    | 21  |
| Laminators .....                                         | 750 |
| Unitizers and load strappers .....                       | 116 |
| Bundle tyers .....                                       | 249 |
| Computers .....                                          | 73  |

#### Estimated Expenditures

##### Materials

|                                             |              |
|---------------------------------------------|--------------|
| Corrugating adhesives .....                 | \$12,329,140 |
| Printing inks .....                         | 10,191,720   |
| Waxes and coatings .....                    | 13,974,720   |
| Adhesives, including synthetic resins ..... | 1,858,560    |
| Joining tapes .....                         | 2,232,960    |
| Stitch wire and staples .....               | 565,440      |

##### Supplies

|                                    |           |
|------------------------------------|-----------|
| Printing plates and dies .....     | 6,515,520 |
| Cutting rule and dies .....        | 4,118,250 |
| Pallet materials .....             | 3,344,840 |
| Twine .....                        | 775,680   |
| Strapping: steel and plastic ..... | 2,008,320 |
| Baling supplies .....              | 254,400   |
| Oil and lubricants .....           | 1,174,080 |
| Maintenance supplies .....         | 3,012,480 |

## Converter's Buying Plans Will Center on Payback Potential in '83

Spending will slowly start picking up late this year.

**"R**ight now the emphasis is on payback. There are not many people out there buying machinery."

Although this observation from the president of a corrugated box plant might be considered by some a gross generalization, after speaking to key equipment manufacturers and box-makers throughout the nation, Paperboard Packaging agrees with it. In talking to those executives with purchasing power, many of them noted that they had not bought any new equipment in years. But more importantly, when asked if they had any plans to purchase new equipment in the next couple of years they all answered in the affirmative.

Probably a major reason for this development is the effect of what was seen at DRUPA last June. Numerous converters did not realize until they attended the largest paper converting machinery show in the world (the next one will be held in 1986, not 1987, by the way) how out of date some of their equipment really was.

Those who attended DRUPA did some serious shopping but not many cash registers were ringing, so to speak. It was more a matter of watching machinery demonstrations, taking a lot of notes and asking a lot of questions. Then, corrugated and folding carton converters returned home to evaluate all the research and fact finding done in what was for most an event-filled two weeks in Dusseldorf.

Of course, whether the plant is an integrated or an independent it must produce a steady cash flow to generate capital spending programs and unfortunately for the majority of plants in the nation (and, for that matter, the world) therein lies the problem: profits are not materializing. Independent plants are buying when they get a good deal but it is the integrators that must help lead the way. Integrators operate on profits and when they aren't showing

up on the bottom line (which happened to many of them last year) shifts are eliminated, machinery runs at undercapacity and many people find themselves out of a job.

### Increase in activity

Another equipment supplier spokesman noted that his company experienced an increase in activity at the end of last year.

"People are asking for quotes and I'm sure they will study and go over those quotes very carefully (before buying)," he notes. "'83 will be better than '82 but not much better. We're looking to '84."

However, at the same time another supplier notes that "a lot for things will have to happen in '83 for things to pick up in '84. Companies are in tough shape and in scary conditions."

Classically, the corrugated and folding carton industries follow upturns in the economy by around six months so that even if encouraging economic news began dominating the headlines across the country today equipment manufacturers would not reap the benefits of the unleashing of capital funds until June at the earliest. The recession is now a year and a half old. When will it end? Despite all of the rhetoric flowing out of the mouths of Washington politicians from the President on down, Paperboard Packaging does not see an end until April at the earliest.

Used equipment (measured in terms of units sold) started out behind comparable 1981 figures last year but by the fourth quarter sales were dead even with '82, indicating a pickup in the second half. For the first six months of '83 used equipment sales will be even with '81 figures; i.e. ahead of '82. In other words, the first quarter of '83 will be up around 10% over the comparable period last year.

The aftermarket will continue to remain a crucial part of a converter's equipment purchasing decisions. There are five key aftermarket areas: warranty service, price of parts, availability of parts, availability of service, and serviceability of equipment.

### Retrofitting developments

Another trend that will be prevalent next year and in years to come is the conversion and retrofitting of equipment, which will include

## '83 Forecast

*continued*

presses, diecutters and folder-glueers.

Although flexographic printing is not yet a science like gravure, some truly impressive work is coming out of plants throughout the nation. Two, three and four color flexographic printing is on the rise as more and more converters realize that high quality printing jobs are being produced consistently.

In dollar terms, capital investment expenditures by the box converting industry will be down in 1983. The industry will probably be spending a little over \$6 million to upgrade and modernize its collective production plant. Paperboard Packaging estimates that no more than three full corrugators will be sold in 1983. True, interest rates have been moving down but nagging doubts remain as to whether or not they will stay down as the year progresses.

Foreign machinery manufacturers (especially the Italians) have been steadily improving their products to meet and maintain high American standards. U.S. equipment manufacturers can not afford to ignore them and converters, especially after DRUPA, are taking a closer look at what the Italians, Germans, British, Japanese and Swiss are entering into the market. The Italian government is helping the cause of its machinery manufacturers by offering attractive financing to potential American customers.

Finally, over the past year a number of major manufacturers have come out with press feeders and diecutters that have helped speed and accuracy rise steadily.

### Folding Carton Industry Evolving in Several Directions

Vitality will lie in vigorous contention for new applications.

It has become almost traditional that comparison of annual folding carton forecasts with the realities

developed leaves the predictors looking less than divinely inspired.

The word "flat" has been applied so often, for so long, in describing the folding carton field that some question must begin to appear and grow.

It is to wonder whether this really is just another temporary economic pause, like that now stagnating other sectors—or whether the folding carton may be a matured commodity that simply has reached its full potential.

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**Any business plans for future participation in the folding carton market, by equipment sales or otherwise, must advisably accept that this is no longer anything like the competitive young enterprise that it once was.**

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The average American's use of folding cartons—in rough terms of pounds per year—is not growing. It is in fact declining steadily, and has been for a matter of decades.

What should be the reaction of even an amateur economist to the following factual statement, as applied to any long-established product:

"Its volume of consumption by the average citizen is 20% below that of 40 years ago, and during those four decades there has been no year in which the per capita consumption was not below that of the previous year."

The observer could only consider that, for whatever reason, the product referred to is subject to conditions, of some sort, that go beyond any contemporary economic ups and downs. He must consider further that these conditions are beyond the control or correction of the product's manufacturers, or their promotional efforts would have had some effect by now.

His further calculation would reveal that members of the present "homemaking generation"—those now entering their thirties—are using approximately 100 fewer of this product per year than their parents did.

He would have to feel that any upward forecasts for future years' expansion of this product must be based upon factors not quite visible from here. The product is the paperboard folding carton.

The upward forecasts of increasing volume do continue, however. One professional projection sees physical volume growth rates through 1987 as nearly double those of the 1970-80 period (a decade in which folding boxboard consumption rose 7.6%, in the face of a 9.5% population growth).

### Not in the cards

If that doubling of rate were to be accomplished, it would mean that in the next five years folding boxboard volume must rise seven times as fast as it has in the entire previous 20 years. This simply does not seem to be in the cards.

It appears more realistic to expect that the carton industry will do well to maintain its present minimal rate of expansion, which is 80% of the growth in population. On that optimistic basis, folding carton production in 1987 would be less than 5% above 1982, and in 1990 would be less than 10% above.

That growth rate, which seems reasonably derived, is not sufficient to support the increasingly expensive maintenance of all existing carton plants, and the addition or replacement of equipment, at the former "normal" levels.

This assessment evidently is not lost upon profit-accountable managers of the carton industry. They appear alert to the possibility, and in fact many of them are not even strangers to it.

In their youth, for one of many examples, they saw the paperboard milk carton overwhelm and replace the clumsy, returnable glass bottle, only to be replaced in turn by the thin blown-plastic jug, which now has weathered legislative attack.

They saw the dozen-eggs-in-a-bag replaced by the segmented paperboard carton, and then saw the carton yield to a molded pulp or colorful foamed plastic. They have seen milady's high-volume hosiery box yield to the see-through film envelope. But it has been many years since they saw the paperboard carton take over from an alternate packaging. Now, the shoe is on the other foot.

### Plants are closing

And so, they are not temporizing. They are closing the marginal plants. They can no longer be diverted by the enthusiastic marketing concepts that if we just improve the folding carton graphics, and motivate the salesmen ... No longer. They are



## '83 Forecast

continued

simply closing the plants.

In the five-year span between mid-1977 and mid-'82, a total of 61 U.S. folding carton production facilities were closed, and 45 operating companies went out of business, according to the listings in our *Official Container Directory*—these listings being provided to us by the operating companies themselves.

Nor has that movement yet ended. In more recent months, a number of additional major folding carton production plants have been reported permanently closed. Not sold, or curtailed, but closed. And not ancient, obsolescent facilities that would cost too much to refurbish, but standard plants adequately equipped to operate in a promising market. The day is gone, apparently, when such properties were eagerly acquired, when available, by carton specialists seeking to expand share in a promising market.

What is it, then, that should be expected to happen in the next five years, such as not only to reverse

this incessant trend of the past 40 years, but also to double the expansion rate of the previous ten years? It would be a disservice to publish or repeat any such forecast. There are no factors or changing conditions visible that would validate or support it.

Any business plans for future participation in the folding carton market, by equipment sales or otherwise, must advisably accept that this is no longer anything like the competitive young enterprise that it once was.

Such business plans must relate to improving carton features and qualities designed to resist further inroads by competitive packagings, as distinct from seeking a significantly larger share in an expanding market. There is no expanding market.

### Base is contracting

Successful equipment innovations will be directed to replacing or retrofitting existing machinery with more-effective operating details, rather than primarily to sell additional machines. The production base is contracting, not growing.

Many equipment producers are already looking to that basic revision of target, with mechanisms for automatic process control and monitoring, production speed-up, reduction of material waste, and other areas of eliminating avoidable cost. It may be predicted that the new or modernized plant of the future will be designed primarily with that outlook, rather than in expectation of any greatly expanded market volume.

Many may consider that an unduly pessimistic view. Much is made of the pent-up prospects for high prosperity "once the economy gets moving again" and consumers are less cautious about expenditures, and all product areas will resume their former glory.

For folding cartons, there are flaws in that view. It may very well be, for example, that the hoped-for upturn will appear—because it has to—in the besieged automotive and construction industries. The automobiles being driven today are wearing out, and the housing is bulging, and in time consumers will be forced to accept these high expenditures at whatever cost in other aspects of

### Folding Paperboard Boxes (SIC 2651): Trends and Projections 1972-83

(in millions of dollars except as noted)

| Item                                                  | 1972    | 1977    | 1979    | 1980 <sup>1</sup> | 1981 <sup>1</sup> | 1982 <sup>1</sup> | Compound<br>annual<br>rate of<br>growth<br>1972-82 | 1983 <sup>2</sup> | Percent<br>change<br>1982-83 <sup>3</sup> |
|-------------------------------------------------------|---------|---------|---------|-------------------|-------------------|-------------------|----------------------------------------------------|-------------------|-------------------------------------------|
| <b>Industry data</b>                                  |         |         |         |                   |                   |                   |                                                    |                   |                                           |
| Value of shipments <sup>4</sup>                       | 1,487.0 | 2,579.0 | 2,950.0 | 3,276.5           | 3,551.7           | 3,789.7           | —                                                  | —                 | —                                         |
| Value of shipments (1972 \$) <sup>5</sup>             | 1,487.0 | 1,553.9 | 1,617.9 | 1,579.1           | 1,561.7           | 1,577.3           | +0.6                                               | 1,604.1           | +1.7                                      |
| Total employment (000)                                | 45.3    | 44.7    | 45.0    | 45.5              | 45.8              | 46.2              | +0.1                                               | 46.5              | +0.6                                      |
| Production workers (000)                              | 36.5    | 35.8    | 36.1    | 36.3              | 36.2              | 36.0              | -0.1                                               | 36.2              | +0.6                                      |
| Average hourly earnings of<br>production workers (\$) | 3.90    | 5.71    | 6.40    | 6.91              | 7.47              | 7.94              | +7.3                                               | —                 | —                                         |
| Capital expenditures                                  | 37.4    | 89.8    | 75.8    | 92.2              | —                 | —                 | —                                                  | —                 | —                                         |
| <b>Product data</b>                                   |         |         |         |                   |                   |                   |                                                    |                   |                                           |
| Value of shipments <sup>4</sup>                       | 1,372.1 | 2,393.4 | 2,797.6 | 3,152.9           | 3,417.7           | 3,691.1           | —                                                  | —                 | —                                         |
| Value of shipments (1972 \$) <sup>5</sup>             | 1,372.1 | 1,433.8 | 1,492.9 | 1,457.1           | 1,444.1           | 1,458.5           | +0.6                                               | 1,483.3           | +1.7                                      |
| Product price index (1972 = 100)                      | 100.0   | 127.4   | 132.9   | 154.8             | 171.1             | 183.0             | —                                                  | —                 | —                                         |
| Quantity shipped (1000 short tons)                    | 2,525   | 2,639   | 2,748   | 2,882             | 2,652             | 2,679             | +0.6                                               | 2,724             | +1.7                                      |
| <b>Trade</b>                                          |         |         |         |                   |                   |                   |                                                    |                   |                                           |
| Value of exports                                      | 5.9     | 13.0    | 20.6    | 25.9              | 26.4              | 25.1              | —                                                  | 26.5              | +5.6                                      |
| Value of imports                                      | 5.0     | 10.0    | 14.8    | 15.6              | 9.6               | 9.5               | —                                                  | 12.0              | +26.3                                     |
| Export/shipments ratio <sup>6</sup>                   | 0.004   | 0.005   | 0.007   | 0.008             | 0.008             | 0.007             | —                                                  | —                 | —                                         |
| Import/new supply ratio <sup>6</sup>                  | 0.001   | 0.001   | 0.001   | 0.001             | 0.001             | 0.001             | —                                                  | —                 | —                                         |

<sup>1</sup> Estimated except for product price index, exports, and imports.

<sup>2</sup> Estimated.

<sup>3</sup> Forecast.

<sup>4</sup> Value of all products and services sold by industry SIC 2651.

<sup>5</sup> Value of shipments of folding paperboard box.

<sup>6</sup> New supply is the sum of product shipments plus imports.

Source: Bureau of the Census and Bureau of Industrial Economics. Estimates and forecasts by the Bureau of Industrial Economics.

## '83 Forecast

continued

their life style. However, those industries never were prominent customers for folding cartons, and the money they extract, over years-long periods of mortgage payoff, will be unavailable for non-essential cartoned products.

On the other hand, some important national trends are highly supportive to folding carton futures. In the single area of foodstuffs, for example—largest single outlet for the cartons—the rise of "convenience" foods is no passing fad. These would include those sold in "ovenable" board containers for quick preparation. The potential is great and rising, as two-income families proliferate, and the working housewife has limited time. Retort pouches are growing in the same category as a time-saver, and have proved a fine application for cartoning.

### Single-portion coming on

Another favorable long-term trend is in the single-portion packaging that caters not only to persons living alone but to family partners on conflicting time schedules. The latest census showed a 60% increase, over ten years, in the number of single-person households, where the single-portion package has an obvious appeal.

Further, there is the finding that with increased "eating out" by families and individuals, the proportion of food purchased at market for home preparation has dropped in recent years from a traditional 85% to a current 60%, as the fast-food stands increase in both number and menu variety. Many of these portions are served in disposable paper boxes or shallow trays, converted on folding carton equipment.

It is difficult to place any allegedly accurate estimate on the volume of folding cartons that may find a market in this expanding area. However, it is not difficult to calculate that the use of a single carton per day by each of this nation's people represents around 84 billion boxes per year.

How many folding cartons make a billion? If a single box-making machine were to produce one carton per second, 24 hours per day, it would require 11½ days to make a million cartons. But it would take

32 years to make a billion—and 2688 years to make 84 billion, the equivalent of one carton per day, per citizen, per year.

So, the industry is very far from moribund. However, those great new areas for expanding markets no longer exist, as the record of 40 years shows, and none is on the horizon.

The industry's vitality will lie in vigorous contention for present applications, through the innovative design for which it is already famous, together with continuing refinements in the efficiency of its processes, at all levels.

## Total United States

### Major Equipment

|                                                      |      |
|------------------------------------------------------|------|
| Folding carton plants                                | 550  |
| Cutters & creasers                                   | 1997 |
| Letterpress printing presses                         | 804  |
| Offset printing presses                              | 764  |
| Up to three colors                                   | 255  |
| Over three colors                                    | 304  |
| Up to 60 inches                                      | 391  |
| Over 60 inches                                       | 167  |
| Dry offset or letterpress printing presses           | 110  |
| Flexographic printing presses                        | 186  |
| Gravure printing presses, sheet & web fed            | 141  |
| Glue, timed: right angle infeed/outfeed tapered tray | 832  |
| Glue, untimed straight line                          | 1031 |
| Waxers and waxing attachments                        | 288  |
| Laminators                                           | 143  |
| Sheet cutters, guillotine                            | 446  |
| Sheeters, web fed                                    | 217  |
| In-plant corrugated boxmaking equipment              | 48   |
| Case sealers                                         | 217  |

### Estimated Expenditures

|                                                                   |              |
|-------------------------------------------------------------------|--------------|
| Specialty papers                                                  | \$62,595,000 |
| Inks, folding cartons and milk                                    | 122,655,000  |
| Waxes & coatings, folding cartons                                 | 20,475,000   |
| Corrugated containers                                             | 73,125,000   |
| Die materials, including cutting rule                             | 23,887,500   |
| Press plates and other printing supplies, excluding ink (folding) | 110,565,000  |
| Adhesives, including synthetic adhesives                          | 27,007,500   |
| Embossing foils                                                   | 18,230,000   |
| Tapes                                                             | 4,290,000    |
| Maintenance supplies and materials (F.C.)                         | 49,042,500   |



DELAWARE  
DISTRICT OF COLUMBIA  
FLORIDA  
GEORGIA  
MARYLAND  
NORTH CAROLINA  
PUERTO RICO  
SOUTH CAROLINA  
VIRGINIA  
WEST VIRGINIA

## South Atlantic

### Major Equipment

|                                                      |     |
|------------------------------------------------------|-----|
| Folding carton plants                                | 66  |
| Cutters & creasers                                   | 254 |
| Letterpress printing presses                         | 61  |
| Offset printing presses                              | 64  |
| Up to three colors                                   | 25  |
| Over three colors                                    | 23  |
| Up to 60 inches                                      | 34  |
| Over 60 inches                                       | 6   |
| Dry offset or letterpress printing presses           | 8   |
| Flexographic printing presses                        | 27  |
| Gravure printing presses, sheet & web fed            | 25  |
| Glue, timed: right angle infeed/outfeed tapered tray | 109 |
| Glue, untimed straight line                          | 108 |
| Waxers and waxing attachments                        | 50  |
| Laminators                                           | 9   |
| Sheet cutters, guillotine                            | 44  |
| Sheeters, web fed                                    | 27  |
| In-plant corrugated boxmaking equipment              | 5   |
| Case sealers                                         | 24  |

### Estimated Expenditures

|                                           |              |
|-------------------------------------------|--------------|
| Specialty papers                          | \$ 4,805,775 |
| Ink                                       | 9,418,500    |
| Waxes and coatings (F.C.)                 | 3,367,650    |
| Corrugated containers                     | 5,615,025    |
| Die materials                             | 2,074,800    |
| Press plates and printing supplies        | 10,046,400   |
| Adhesives                                 | 2,736,825    |
| Embossing foils                           | 1,407,900    |
| Tapes                                     | 329,550      |
| Maintenance materials and supplies (F.C.) | 6,588,075    |

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## '83 Forecast

continued from page 38



### Middle Atlantic

NEW JERSEY  
NEW YORK  
PENNSYLVANIA

#### Major Equipment

|                                                         |     |
|---------------------------------------------------------|-----|
| Folding carton plants                                   | 130 |
| Cutters & creasers                                      | 155 |
| Letterpress printing presses                            | 271 |
| Offset printing presses                                 | 197 |
| Up to three colors                                      | 71  |
| Over three colors                                       | 97  |
| Up to 60 inches                                         | 106 |
| Over 60 inches                                          | 43  |
| Dry offset or letterpress printing presses              | 49  |
| Flexographic printing presses                           | 34  |
| Gravure printing presses, sheet & web fed               | 38  |
| Gluers, timed: right angle infold/outfold tapered trays | 219 |
| Gluers, untimed straight line                           | 300 |
| Waxers and waxing attachments                           | 70  |
| Laminators                                              | 31  |
| Sheet cutters, guillotine                               | 111 |
| Sheeters, web fed                                       | 35  |
| In-plant corrugated boxmaking equipment                 | 6   |
| Case sealers                                            | 48  |

#### Estimated Expenditures

|                                           |              |
|-------------------------------------------|--------------|
| Specialty papers                          | \$17,910,750 |
| Ink                                       | 35,096,100   |
| Waxes and coatings (F.C.)                 | 4,290,000    |
| Corrugated containers                     | 20,923,500   |
| Die materials                             | 6,676,800    |
| Press plates and printing supplies        | 37,440,000   |
| Adhesives                                 | 7,458,750    |
| Embossing foils                           | 5,245,500    |
| Tapes                                     | 1,227,525    |
| Maintenance materials and supplies (F.C.) | 24,550,500   |



### New England

CONNECTICUT  
MAINE  
MASSACHUSETTS  
NEW HAMPSHIRE  
RHODE ISLAND  
VERMONT

#### Major Equipment

|                                                         |     |
|---------------------------------------------------------|-----|
| Folding carton plants                                   | 53  |
| Cutters & creasers                                      | 282 |
| Letterpress printing presses                            | 117 |
| Offset printing presses                                 | 71  |
| Up to three colors                                      | 27  |
| Over three colors                                       | 26  |
| Up to 60 inches                                         | 35  |
| Over 60 inches                                          | 17  |
| Dry offset or letterpress printing presses              | 13  |
| Flexographic printing presses                           | 8   |
| Gravure printing presses, sheet & web fed               | 2   |
| Gluers, timed: right angle infold/outfold tapered trays | 66  |
| Gluers, untimed straight line                           | 106 |
| Waxers and waxing attachments                           | 21  |
| Laminators                                              | 15  |
| Sheet cutters, guillotine                               | 44  |
| Sheeters, web fed                                       | 18  |
| In-plant corrugated boxmaking equipment                 | 4   |
| Case sealer                                             | 13  |

#### Estimated Expenditures

|                                           |              |
|-------------------------------------------|--------------|
| Specialty papers                          | \$ 6,483,750 |
| Ink                                       | 10,413,000   |
| Waxes and coatings (F.C.)                 | 1,357,200    |
| Corrugated containers                     | 79,462,500   |
| Die materials                             | 2,598,375    |
| Press plates and printing supplies        | 2,593,500    |
| Adhesives                                 | 2,502,825    |
| Embossing foils                           | 1,555,125    |
| Tapes                                     | 363,675      |
| Maintenance materials and supplies (F.C.) | 7,282,961    |



### East North Central

ILLINOIS  
INDIANA  
MICHIGAN  
OHIO  
WISCONSIN

#### Major Equipment

|                                                         |     |
|---------------------------------------------------------|-----|
| Folding carton plants                                   | 137 |
| Cutters & creasers                                      | 613 |
| Letterpress printing presses                            | 206 |
| Offset printing presses                                 | 201 |
| Up to three colors                                      | 71  |
| Over three colors                                       | 77  |
| Up to 60 inches                                         | 90  |
| Over 60 inches                                          | 55  |
| Dry offset or letterpress printing presses              | 23  |
| Flexographic printing presses                           | 41  |
| Gravure printing presses, sheet & web fed               | 52  |
| Gluers, timed: right angle infold/outfold tapered trays | 191 |
| Gluers, untimed straight line                           | 260 |
| Waxers and waxing attachments                           | 70  |
| Laminators                                              | 42  |
| Sheet cutters, guillotine                               | 103 |
| Sheeters, web fed                                       | 52  |
| In-plant corrugated boxmaking equipment                 | 16  |
| Case sealers                                            | 56  |

#### Estimated Expenditures

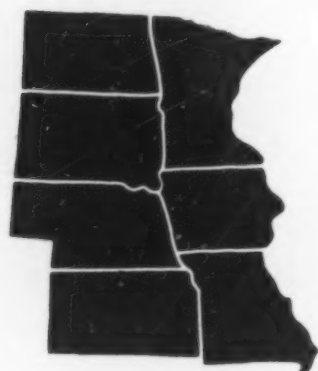
|                                           |              |
|-------------------------------------------|--------------|
| Specialty papers                          | \$16,446,300 |
| Ink                                       | 32,227,650   |
| Waxes and coatings (F.C.)                 | 4,927,650    |
| Corrugated containers                     | 18,525,000   |
| Die materials                             | 5,728,125    |
| Press plates and printing supplies        | 34,378,500   |
| Adhesives                                 | 6,473,025    |
| Embossing foils                           | 4,816,500    |
| Tapes                                     | 1,127,100    |
| Maintenance materials and supplies (F.C.) | 22,425,000   |

(continued on page 48)



## '83 Forecast

(continued from page 45)



### West North Central

IOWA  
KANSAS  
MINNESOTA  
MISSOURI  
NEBRASKA  
NORTH  
DAKOTA  
SOUTH  
DAKOTA

#### Major Equipment

|                                                         |     |
|---------------------------------------------------------|-----|
| Folding carton plants                                   | 38  |
| Cutters & creasers                                      | 191 |
| Letterpress printing presses                            | 53  |
| Offset printing presses                                 | 66  |
| Up to three colors                                      | 31  |
| Over three colors                                       | 22  |
| Up to 60 inches                                         | 40  |
| Over 60 inches                                          | 8   |
| Dry offset or letterpress printing presses              | —   |
| Flexographic printing presses                           | 24  |
| Gravure printing presses, sheet & web fed               | 3   |
| Gluers, timed: right angle infold/outfold tapered trays | 57  |
| Gluers, untimed straight line                           | 60  |
| Waxers and waxing attachments                           | 20  |
| Laminators                                              | 11  |
| Sheet cutters, guillotine                               | 34  |
| Sheeters, web fed                                       | 20  |
| In-plant corrugated boxmaking equipment                 | 5   |
| Case sealers                                            | 20  |

#### Estimated Expenditures

|                                           |              |
|-------------------------------------------|--------------|
| Specialty papers                          | \$ 5,482,425 |
| Ink                                       | 10,742,550   |
| Waxes and coatings (F.C.)                 | 1,846,650    |
| Corrugated containers                     | 6,403,800    |
| Die materials                             | 2,012,400    |
| Press plates and printing supplies        | 11,460,150   |
| Adhesives                                 | 2,088,450    |
| Embossing foils                           | 1,604,850    |
| Tapes                                     | 375,375      |
| Maintenance materials and supplies (F.C.) | 7,514,325    |



### East South Central

ALABAMA  
KENTUCKY  
MISSISSIPPI  
TENNESSEE

#### Major Equipment

|                                                         |    |
|---------------------------------------------------------|----|
| Folding carton plants                                   | 30 |
| Cutters & creasers                                      | 87 |
| Letterpress printing presses                            | 21 |
| Offset printing presses                                 | 32 |
| Up to three colors                                      | 19 |
| Over three colors                                       | 12 |
| Up to 60 inches                                         | 24 |
| Over 60 inches                                          | 1  |
| Dry offset or letterpress printing presses              | 3  |
| Flexographic printing presses                           | 9  |
| Gravure printing presses, sheet & web fed               | 5  |
| Gluers, timed: right angle infold/outfold tapered trays | 40 |
| Gluers, untimed straight line                           | 43 |
| Waxers and waxing attachments                           | 5  |
| Laminators                                              | 5  |
| Sheet cutters, guillotine                               | 19 |
| Sheeters, web fed                                       | 13 |
| In-plant corrugated boxmaking equipment                 | 6  |
| Case sealers                                            | 5  |

#### Estimated Expenditures

|                                           |             |
|-------------------------------------------|-------------|
| Specialty papers                          | \$2,572,050 |
| Ink                                       | 5,039,775   |
| Waxes and coatings (F.C.)                 | 543,075     |
| Corrugated containers                     | 3,004,950   |
| Die materials                             | 753,675     |
| Press plates and printing supplies        | 1,377,125   |
| Adhesives                                 | 1,180,725   |
| Embossing foils                           | 753,675     |
| Tapes                                     | 176,475     |
| Maintenance materials and supplies (F.C.) | 3,525,600   |



### West South Central

ARKANSAS  
LOUISIANA  
OKLAHOMA  
TEXAS

#### Major Equipment

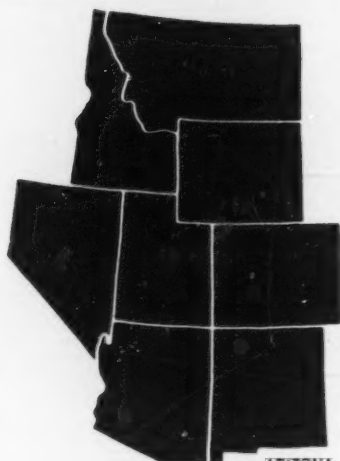
|                                                         |     |
|---------------------------------------------------------|-----|
| Folding Carton plants                                   | 28  |
| Cutters & creasers                                      | 105 |
| Letterpress printing presses                            | 28  |
| Offset printing presses                                 | 27  |
| Up to three colors                                      | 27  |
| Over three colors                                       | 8   |
| Up to 60 inches                                         | 10  |
| Over 60 inches                                          | 1   |
| Dry offset or letterpress printing presses              | 5   |
| Flexographic printing presses                           | 16  |
| Gravure printing presses, sheet & web fed               | 5   |
| Gluers, timed: right angle infold/outfold tapered trays | 37  |
| Gluers, untimed straight line                           | 40  |
| Waxers and waxing attachments                           | 13  |
| Laminators                                              | 4   |
| Sheet cutters, guillotine                               | 16  |
| Sheeters, web fed                                       | 12  |
| In-plant corrugated boxmaking equipment                 | 2   |
| Case sealers                                            | 10  |

#### Estimated Expenditures

|                                           |             |
|-------------------------------------------|-------------|
| Specialty papers                          | \$2,402,400 |
| Ink                                       | 4,709,250   |
| Waxes and coatings (F.C.)                 | 868,725     |
| Corrugated containers                     | 2,807,025   |
| Die materials                             | 1,188,525   |
| Press plates and printing supplies        | 5,023,200   |
| Adhesives                                 | 1,167,075   |
| Embossing foils                           | 703,950     |
| Tapes                                     | 164,775     |
| Maintenance materials and supplies (F.C.) | 3,293,550   |

## '83 Forecast

continued



### Mountain

ARIZONA  
COLORADO  
IDAHO  
MONTANA  
NEVADA  
NEW MEXICO  
UTAH  
WYOMING

#### Major Equipment

|                                                               |    |
|---------------------------------------------------------------|----|
| Folding carton plants .....                                   | 7  |
| Cutters & creasers .....                                      | 27 |
| Letterpress printing presses .....                            | 11 |
| Offset printing presses .....                                 | 10 |
| Up to three colors .....                                      | 14 |
| Over three colors .....                                       | 2  |
| Up to 60 inches .....                                         | 4  |
| Over 60 inches .....                                          | —  |
| Dry offset or letterpress printing presses .....              | —  |
| Flexographic printing presses .....                           | —  |
| Gravure printing presses, sheet & web fed .....               | —  |
| Gluers, timed: right angle infold/outfold tapered trays ..... | 8  |
| Gluers, untimed straight line .....                           | 12 |
| Waxers and waxing attachments .....                           | —  |
| Laminators .....                                              | —  |
| Sheet cutters, guillotine .....                               | 12 |
| Sheeters, web fed .....                                       | 6  |
| In-plant corrugated boxmaking equipment .....                 | —  |
| Case sealers .....                                            | 1  |

#### Estimated Expenditures

|                                                 |            |
|-------------------------------------------------|------------|
| Specialty papers .....                          | \$ 769,275 |
| Ink .....                                       | 1,508,325  |
| Waxes and coatings (F.C.) .....                 | —          |
| Corrugated containers .....                     | 898,950    |
| Die materials .....                             | 239,850    |
| Press plates and printing supplies .....        | 1,608,750  |
| Adhesives .....                                 | 259,350    |
| Embossing foils .....                           | 225,225    |
| Tapes .....                                     | 52,650     |
| Maintenance materials and supplies (F.C.) ..... | 1,054,950  |



### Pacific

ALASKA  
CALIFORNIA  
HAWAII  
OREGON  
WASHINGTON

#### Major Equipment

|                                                               |     |
|---------------------------------------------------------------|-----|
| Folding carton plants .....                                   | 61  |
| Cutters & creasers .....                                      | 283 |
| Letterpress printing presses .....                            | 36  |
| Offset printing presses .....                                 | 96  |
| Up to three colors .....                                      | 41  |
| Over three colors .....                                       | 37  |
| Up to 60 inches .....                                         | 48  |
| Over 60 inches .....                                          | 23  |
| Dry offset or letterpress printing presses .....              | 9   |
| Flexographic printing presses .....                           | 27  |
| Gravure printing presses, sheet & web fed .....               | 11  |
| Gluers, timed: right angle infold/outfold tapered trays ..... | 105 |
| Gluers, untimed straight line .....                           | 102 |
| Waxers and waxing attachments .....                           | 39  |
| Laminators .....                                              | 26  |
| Sheet cutters, guillotine .....                               | 63  |
| Sheeters, web fed .....                                       | 34  |
| In-plant corrugated boxmaking equipment .....                 | 4   |
| Case sealers .....                                            | 40  |

#### Estimated Expenditures

|                                                 |              |
|-------------------------------------------------|--------------|
| Specialty papers .....                          | \$ 6,890,325 |
| Ink .....                                       | 13,501,800   |
| Waxes and coatings (F.C.) .....                 | 2,987,400    |
| Corrugated containers .....                     | 8,049,600    |
| Die materials .....                             | 2,615,925    |
| Press plates and printing supplies .....        | 14,402,700   |
| Adhesives .....                                 | 3,100,500    |
| Embossing foils .....                           | 2,017,275    |
| Tapes .....                                     | 471,900      |
| Maintenance materials and supplies (F.C.) ..... | 9,443,850    |

## Rigid Paper Box Industry: Outlook Encouraging

For 1983 . . . gradual uptrend, then last-half acceleration.

The rigid box industry moved through the first three quarters of 1982 at an average dollar billings level 7.7% below that of 1981. January, February and June, 1982 were, however, better than or almost equal to the comparable months of 1981, while each of the other 1982 months fall to 10% behind. In the last quarter of '82 there is no evidence of a strong finish for the year, although a moderate improvement is anticipated.

We therefore expect the calendar year 1982 to fall 6% short of the dollar volume for the rigid box industry output achieved in 1981. Measured in dollars, the 1982 industry billings were on par with 1980, which was the second biggest dollar level ever.

In absolute dollars, 1982 industry sales were \$485 million—just short of the over one-half billion dollars totaled in 1981. Translated into deflated dollars the physical output dropped in 1982 by approximately 10%.

In dollars the 1967-1981 average annual growth rate of the RPB industry is 4.88%. Unfortunately, this rate has run behind inflation and, over the last 15 years, the industry's production index has declined from 100 to 70.

It must be noted, however, that over the same 15-year period the number of manufacturers of rigid (set-up) boxes shrank dramatically . . . from 454 establishments to fewer than 200 who employ 20 or more persons. Thus, in dollars and in physical units of output, the average remaining boxmaker shows growth.

The size of the pie is growing smaller, but since fewer companies are sharing the total, each slice is larger.

## '83 Forecast

continued

A current sampling of manufacturers throughout the U.S. indicates that, yes, dollar income is down 6% and physical volume may be off 10%;

**The rigid box industry, when stacked against the economy as measured in terms of Gross National Product, is in a moderate depression.**

but profits are holding firm. Industry net profits before taxes, which surveyed at 5% in 1981, should average 6% in 1982.

The rigid box industry, when stacked against the economy as measured in terms of Gross National Product, is in a moderate depression. GNP rose at an annual rate of 6% and real output (GNP adjusted for price change) rose 2%, annual rate, and the implicit price deflator rose at a 4.5% annual rate.

According to a leading manufacturer of rigid paper boxes, it is not necessary to follow the currents of our economy and, with confidence, he is budgeting for increased business in 1983.

Like this producer, many box plant owners realize that since they are in the job shop business, they cannot just wait for customers to come in off the street. They must make and sell creative packages, provide service and, to remain successful, must be prudent managers producing a high quality product.

The life cycle of industries commences with infancy, progresses to growth, then maturity and finally enters the declining phase. For the last decade the RPB industry has been categorized as mature, but entering the declining phase. This may be true in industry terms but, fortunately for the individual manufacturer who offers fine rigid paper box packages, buyers remain enthusiastic.

Rigid boxes are preferred for many different products and for varied reasons. Confectioners need a package that sells, protects and is reusable. A rigid box meets these requirements. Items that need to be dressed up for gift-giving are best complemented by the rigid (set-up) box. Promotional packages are more

impressive if they are stiff, 3-D boxes overwrapped in a specially designed and colorful label.

There is almost universal confidence among the members of NP&PA that there is a promising future for rigid boxes. Well-run companies expect to continue serving their tra-

ditional markets and to creatively develop new users.

The outlook for 1983 is for gradual improvement during the first half of the year, then accelerated improvement after mid-year with sales to run between 5% and 7% ahead of 1982. □

### End-Use Survey of Industry Sales

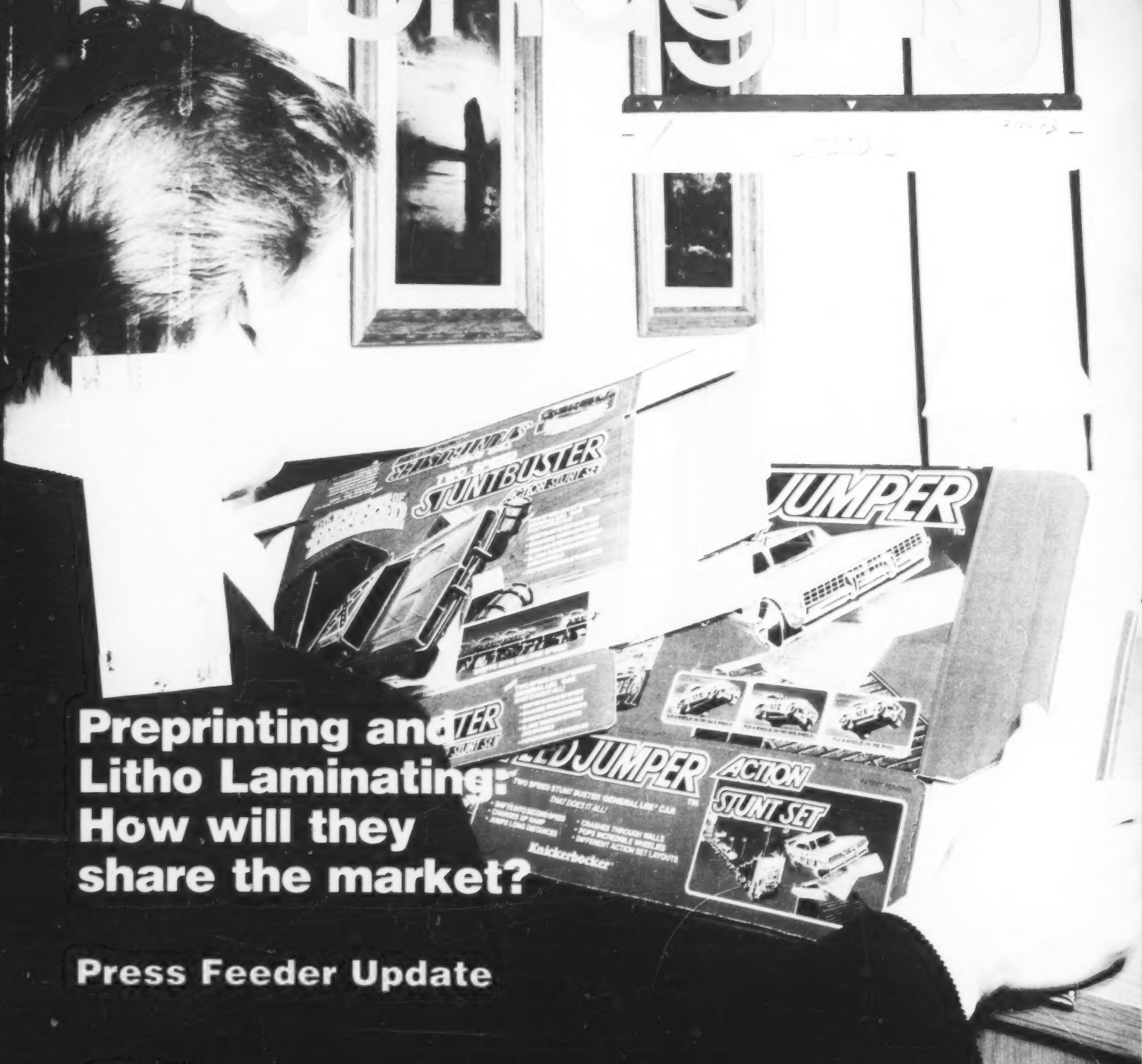
|                                    | (Percent) |      |      |      |      |      |      |      |      |  |
|------------------------------------|-----------|------|------|------|------|------|------|------|------|--|
| (Millions)                         | 1973      | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |  |
| Textiles                           |           |      |      |      |      |      |      |      |      |  |
| Apparel & Hosiery                  | 9.5       | 4.9  | 7.5  | 3.7  | 4.8  | 7.3  | 4.5  | 4.4  | 5.5  |  |
| Dept. Stores & Specialty Shops     | 14.5      | 10.1 | 9.9  | 10.7 | 10.6 | 10.1 | 8.3  | 6.8  | 7.1  |  |
| Cosmetics & Soaps                  | 4.4       | 3.9  | 1.8  | 5.3  | 5.1  | 3.3  | 4.3  | 5.5  | 3.9  |  |
| Confections                        | 10.0      | 9.8  | 13.3 | 10.5 | 8.1  | 9.0  | 15.7 | 12.6 | 18.0 |  |
| Stationery & Office Supplies       | 7.6       | 10.4 | 9.7  | 12.5 | 13.2 | 11.8 | 15.0 | 13.5 | 9.3  |  |
| Jewelry & Silverware               | 8.7       | 8.6  | 5.2  | 4.2  | 14.0 | 10.7 | 7.6  | 9.3  | 9.7  |  |
| Photographic Products & Supplies   | 2.3       | 3.2  | 2.2  | 2.4  | 2.7  | 3.0  | 3.5  | 4.5  | 4.3  |  |
| Shoes & Leather                    | 6.7       | 7.5  | 4.8  | 1.3  | 1.1  | 3.7  | 0.4  | 0.3  | 0.2  |  |
| Drugs, Chemicals & Pharmaceuticals | 7.3       | 7.8  | 6.9  | 9.3  | 7.3  | 4.9  | 13.1 | 7.5  | 7.8  |  |
| Toys & Games                       | 2.5       | 1.1  | 2.3  | 3.3  | 2.6  | 2.1  | 1.4  | 1.4  | 1.8  |  |
| Hardware & Household Supplies      | 4.6       | 7.7  | 7.0  | 6.4  | 6.2  | 5.4  | 3.4  | 5.5  | 4.0  |  |
| Food & Beverages                   | 1.1       | 1.2  | 2.9  | 3.6  | 0.3  | 2.9  | 5.4  | 4.3  | 3.9  |  |
| Sporting Goods                     | 1.6       | 1.4  | 1.9  | 0.7  | 1.0  | 1.2  | 1.7  | 1.2  | 1.2  |  |
| Other Major Customers (A)          |           |      |      |      |      |      |      |      |      |  |
| (a) Electronics                    |           | 2.3  | 3.4  | 4.2  | 2.6  | 2.9  | 4.3  | 3.6  | 3.5  |  |
| (b) Educational                    |           | 4.8  | 3.9  | 3.9  | 6.5  | 5.2  | 3.8  | 3.7  | 4.4  |  |
| (c) Other                          |           | 10.5 | 12.2 | 5.6  | 7.1  | 10.7 | 1.1  | 8.4  | 7.0  |  |
| Misc. Customers                    | 19.3      | 4.8  | 5.1  | 12.4 | 6.8  | 5.8  | 6.5  | 7.5  | 8.4  |  |
|                                    | 100%      | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |  |

Over the years NP&PA has documented the end-use markets for rigid boxes. A breakdown of annual sales is shown in this table.



February 1983

# paper board packaging



**Preprinting and  
Litho Laminating:  
How will they  
share the market?**

**Press Feeder Update**

AN **mhj** PUBLICATION

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vol 68 no. 2

# February 1983

**HB** A HARCOURT BRACE JOVANOVIICH PUBLICATION



## on the cover

The preprinting of linerboard has been discussed and debated for years and still a lot of people are asking questions and weighing options. What are the latest developments and how will it share the market with other processes? Story begins on page 18. Cover materials courtesy of Schiftenhaus Packaging, Newark, N.J.

## features



### **Preprinting and Litho Laminating: How will they share the market? .....18**

A lot of people are talking about the pros and cons of these methods. A lot of people want to find out more about them, too.

*by Mark Arzoumanian*



### **Press Feeder Update .....26**

A glimpse of the latest technology available in the world market.

*compiled and edited by Jim Larkins*



### **Printer-Slotter Unveiled at Arvco Container .....38**

More than two dozen of the industry's production professionals saw the CCI machine during a recent open house.

*by Fred Sharring*



### **Independent Corrugated Converters Meeting Attracts Record Number of Attendees .....40**

Sessions were targeted on one major goal: helping executives increase plant profitability.



### **Assessing the Role and Importance of the Sheet Plant .....42**

A look at why these corrugated converting plants are here to stay.

*by E. R. DePrez*

*(continued on page 6)*

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 April: AICC Man of the year Award/  
 Folding Carton Competition Results  
 May: Look at Inks

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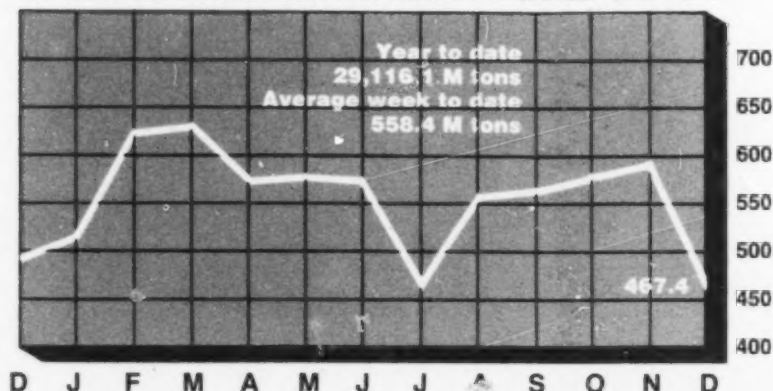
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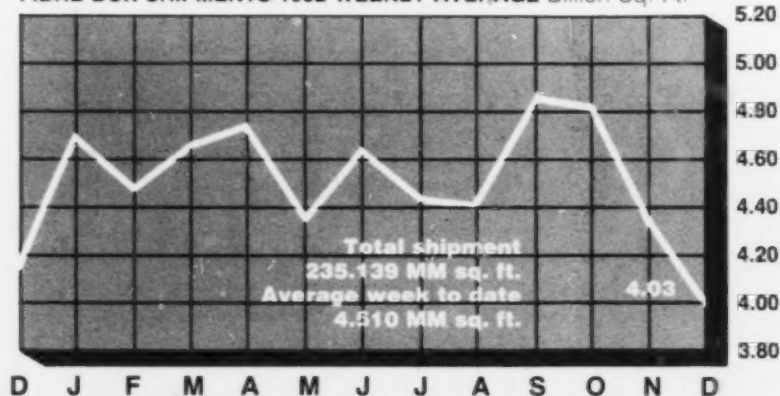
PAPERBOARD PRODUCTION 1982-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

Initial data for 1982—subject to minor refinements—indicate an approximate 29.1 million short tons of total paperboard production, down some 6% from '81 and 7.5% under the 31.5 million all-time high in 1979. Output in the fourth quarter was only a few points below the previous year's volume, after trailing by more than 9% at beginning of the quarter. However, this improvement is relative only to the recession-struck closing months of 1981, during which tonnage dropped far below 1980 levels. That reversal continued throughout 1982, and no significant upturn is yet seen in early 1983.

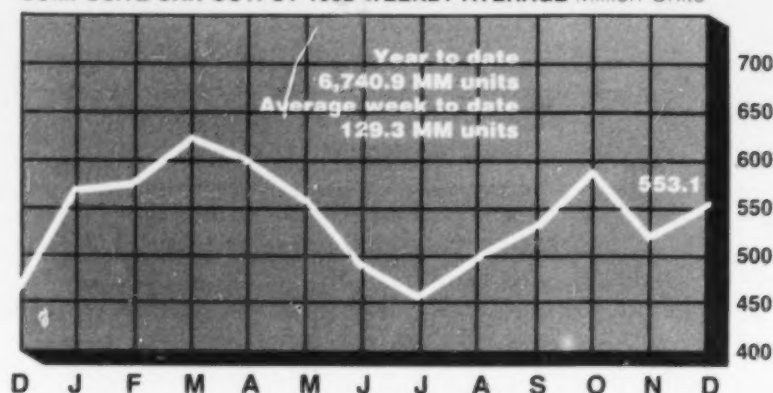
FIBRE BOX SHIPMENTS 1982-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

U.S. output in 1982 included 74% of containerboards, about six percentage points over traditional average. The disparity is due to some, though faded, export demand plus the decline of boxboard packagings under invasion from alternate materials, plus the economic depression. It is to be seen that boxboard gains during cyclical business upturns no longer fully recover their losses during recession. One victim of this evolution is the area of fiber reclamation for recycling, in spite of all campaigns. No upturn is visible in the waste paper area.

COMPOSITE CAN OUTPUT 1982-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Set-up box billings ended 1982 nearly 6% below '81—the first annual decline since a drop in depressed 1975 from '74, and following a half decade of increases averaging 7½% per year. At year-end, only two of eight major regional areas were ahead of last year's billings, with several in the double-digit minus range. Some relative upturn appeared in the final weeks, because of marked improvement in central sectors compared with the year earlier. The producers' association notes that if this continues, it is possible that the business "will evidently be on a recovery road."

March 1983

# paper board packaging

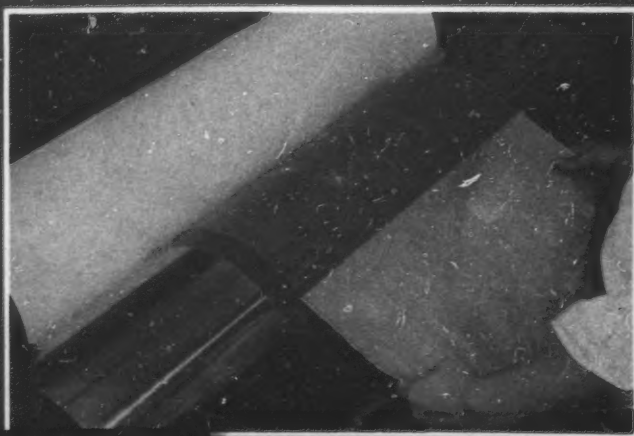
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## Premounting Fundamentals



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vol. 68, no. 3

**March 1983**

**HBJ** A HARCOURT BRACE JOVANOVIICH PUBLICATION



### on the cover

Knowing how to premount is not something you learn overnight. A thorough knowledge of the fundamentals is a must. Photo on lower right, courtesy of Hercules Inc., shows a Merigraph® photopolymer plate being mounted using doublefaced tape on a mounter proofer. Story begins on page 18.

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## features



**Productivity Levels Hinge on Knowing Premounting Fundamentals .....18**  
Matthews International Corp. is making certain that mounters do a professional job each and every run.

*by Mark Arzoumanian*



**Benefits of Renovating Pre-used Equipment Self-Evident at Graph Pak .....22**  
Folding carton converting plant concentrates on making previously owned machinery run with "brand-new" results.

*by Fred Sharring*



**Operator's Job Made Easy with State of the Art F F-G .....28**  
Aeon Box finds Emba's 240, with added control features, the perfect answer to its needs.



**Rule 41: The Changes Ahead .....34**  
Looking back over the entire history of the rule, it is quite remarkable that it has served so well through the years with so few changes.

*by Thomas Muldoon*



**Stripper/Pile Feeder Makes Diecutting "Sinfully Simple" .....42**  
Plant found the answer to its productivity problems with fully equipped Trimodular Segmetec diecutting system.

*by Richard J. Arcand*

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### **Conveyors Solve Problems in Straightforward Manner .....45**

Blower Application's pneumatic scrap removal system improves energy efficiency in corrugated and shipping container plant.



### **On-Line Metering of Adhesive Consumption .....48**

A system of adhesive rate measurement for consistently high quality at lowest starch cost.

by C. H. Sprague et al

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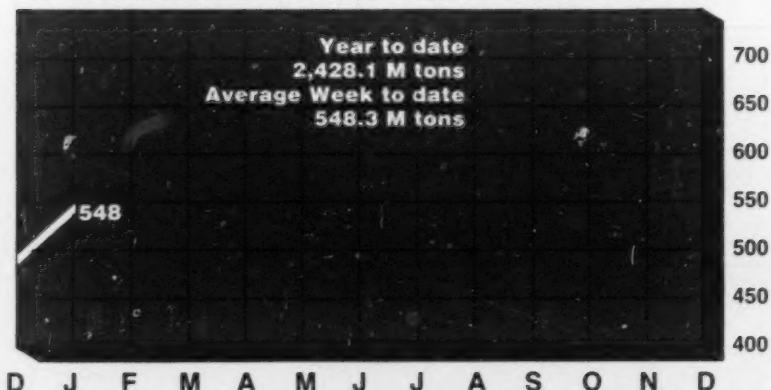
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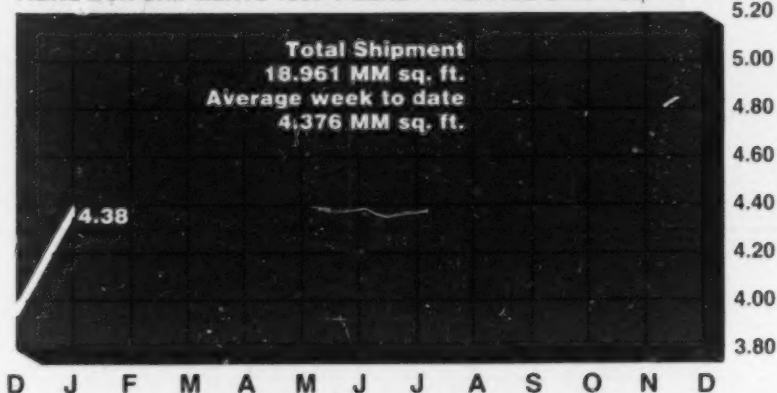
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

The first month of 1983 continued to reflect the moderate upturn that began late last year. A 2428.1-M-ton volume in January was up 7.5% from recessed '82, which had been down 8% from the previous year. However, the tonnage is little greater than that of 1972. This is in part because of extended holiday period mill shutdowns, to reduce the excessive on-hand board inventories, and a significant number of the industry's fourdriniers are still idled. The demand for converted packaging products, though rising, is well below normal levels.

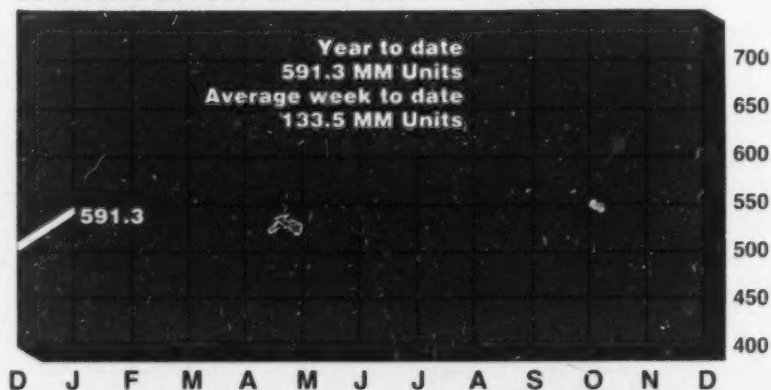
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

January's output included 1792 M tons of containerboards and 636 M of boxboards, up 8.2% and 8.3% respectively from the 1982 month, as projected on historic basis from the American Paper Institute's "production by furnish" tonnages. The advance in boxboard tonnage includes a rise of 10% for recycled grades and of 6% for bleached boards. The trend is evidently toward minimizing carton costs, since the price differential between solid bleached and clay-coated boards is at an all-time high, and continues to expand.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Set-up box billings, up about 5% from the level of early 1982, reflect an increase in unit price rather than in volume. The tonnage of rigid boxes (not reported by the National Paperbox & Packaging Association) in general parallels that entering folding cartons, whose expansion has been not only minimal but minus. This, again, is attributed to continuing recession in such high-volume industries as the automotive, many of whose accessories are small-box packaged—and also to the stagnation in consumer retail purchases of luxury or expendable items that are similarly packaged.

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April 1983

# paper board packaging

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**Folding  
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Competition  
Results**

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vol. 68, no. 4

**April 1983**

**HB** A HARCOURT BRACE JOVANOVIĆ PUBLICATION



### on the cover

Results of the Paperboard Packaging Council's 40th annual National Paperboard Packaging Competition show an industry actively involved in upgrading technology in aesthetics as well as practical engineering. The President's Award winner is a good example of packaging creativity. This feature, complete with photos, begins on page 22.

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*by Mark Arzoumanian*



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The industry is fighting prohibitive production costs with a  
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*by Doug Misercola*

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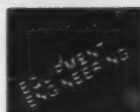
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**Western Kraft Installs  
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Western Kraft solves a myriad of problems with a system that paid for itself in less than six weeks.



**Non-Tearing Axial Corrugation  
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*by James H. Yoke*

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May: FEFCO Preview Inks for Corrugated/  
Strapping, Bundling and Conveyors Update  
June: Midyear Perspective  
July: Flexo Folder-Gluers

# INDUSTRY STATISTICS

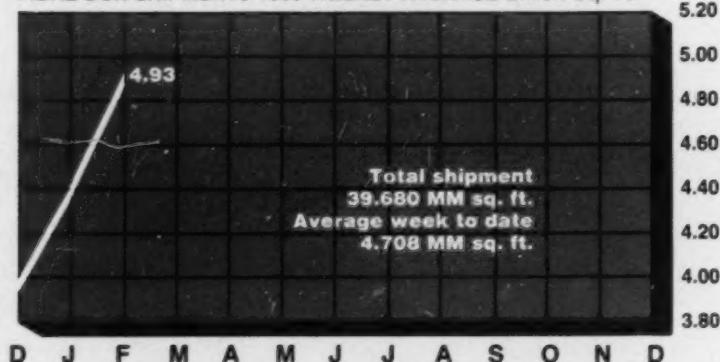
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

Through two months of 1983, paperboard production was up 6.8% from '82, though the margin was narrowing, and volume was 17% above a decade ago. Average-week tonnage in February was down 4.6% from 1982—which had been up 1.3% from '81, which had been 5.6% down from 1980—as mills delayed return to action after extended shutdowns for reduction of excess inventory. Boxboard output, however, was up 2.8% in the month, balancing a 4.6% drop in containerboards.

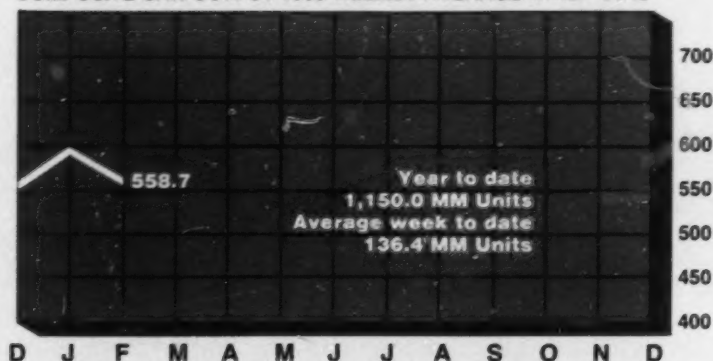
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

In February, 2442.6 M tons of board included a projected 1796.7 M of containerboard types and 645.9 M of boxboards. The unfortunate long-term trend for some packagings is soon in the volume to date, relative to ten years ago—with containerboard tonnage up 27% from same-time 1973, but boxboard volume up only 1%. This relative vigor in containerboards is more reflective of domestic boxmaking than of the still-poor export demand, since conversion of corrugated remains up 5.7% from same-time 1982.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Set-up box billings (total reported sales) in early 1983 are up some 4% from '81, and by 50% in the ten years since 1973, as reported by major producers. This suggests a distinct decline in the tonnage of recent years, since in the parallel case of folding cartons, price per ton has gone up around 8% per year in that period. This would seem to substantiate the decade-long decline in boxboard output, as noted above, with geography having its usual strong influence on the level of local business vigor.



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May 1983

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### on the cover

The Signode Contrax Strapper at Lawrence Paper Co., Lawrence, Kan., is one example of the type of equipment described in *Paperboard Packaging's* feature dealing with strapping and bundling machinery and conveying systems. Story begins on page 28. (Photo courtesy of Inmont Corp.)

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**Get More Sophisticated .....22**  
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*by Robert Gitlin*



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*compiled and edited by Robert Gitlin*



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*by Mark Arzoumanian*

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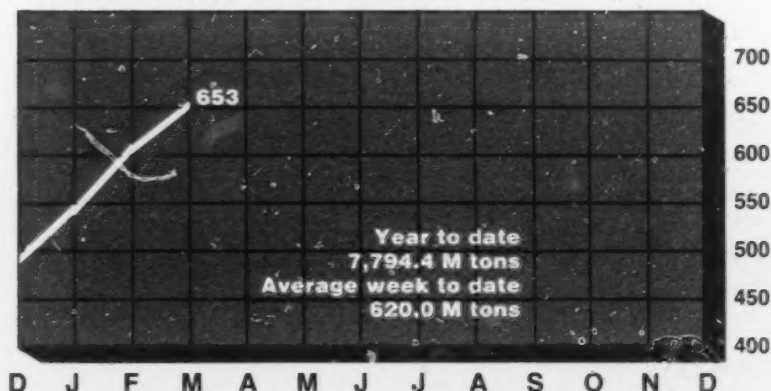
June: Midyear Perspective

July: Flexo Folder-Gluers Coatings

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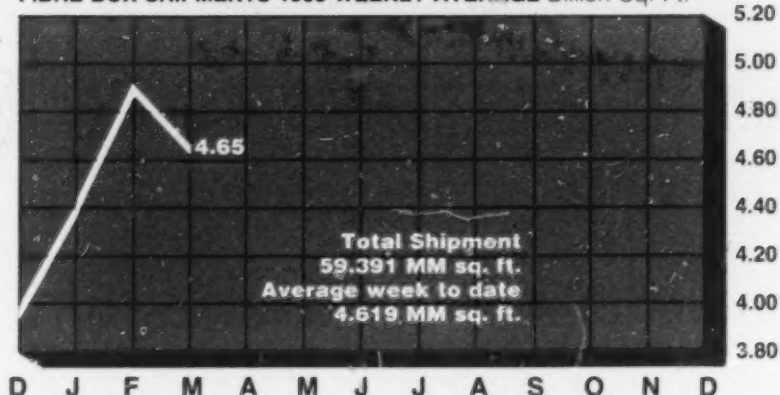
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

At first-quarter end, 1983's average weekly output was 3.5% above same period 1982 tonnage, compared with a drop of 4.7% in '82, from '81, and of 0.8% in '81 from '80, and a rise of 3% in '80 over '79. In March, 2892.6 M tons of production was 3.5% above last year, which had been 1.6% below the 1981 month. It is to be noted that the containerboard grades currently comprise 70% of total tonnage, compared with 66% a decade ago. This delineates the slow but steady decline in folding carton and rigid paper box volume, against competition.

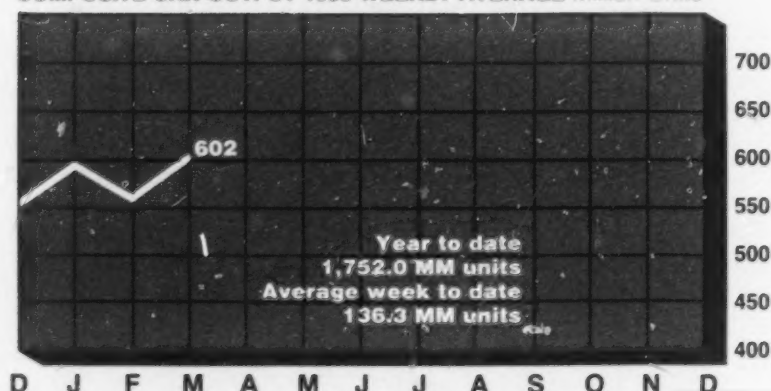
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

In March, the total tonnage of board output included 2197.8 M of containerboards, up 3.3% from 1982 and by 22% in the decade, plus 694.8 M tons of boxboard grades, 3.8% higher than the depressed '81 month, but 15% below the volume of 1973. These reversals probably reflect a permanent evolution in the solid-board packagings. The converted products of boxboard grades are under successful attack by alternates, with "no place else to go." But our containerboards are the least costly in the world—anywhere in the world—and thus the demand is sustained.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Through the first 1983 quarter, set-up box business continued to show a slowdown, despite some signs of a general upturn. The national average billings are down only slightly, but the geographical variations in percentage, ranging from double-digit improvements in the industrialized East to similar declines in coastal areas and interior sectors, are again near all-time extremes. This again illustrates the vulnerability of boxboard packaging products to economy gyrations and to competition from alternate materials—and the latter will not disappear in the upturn.

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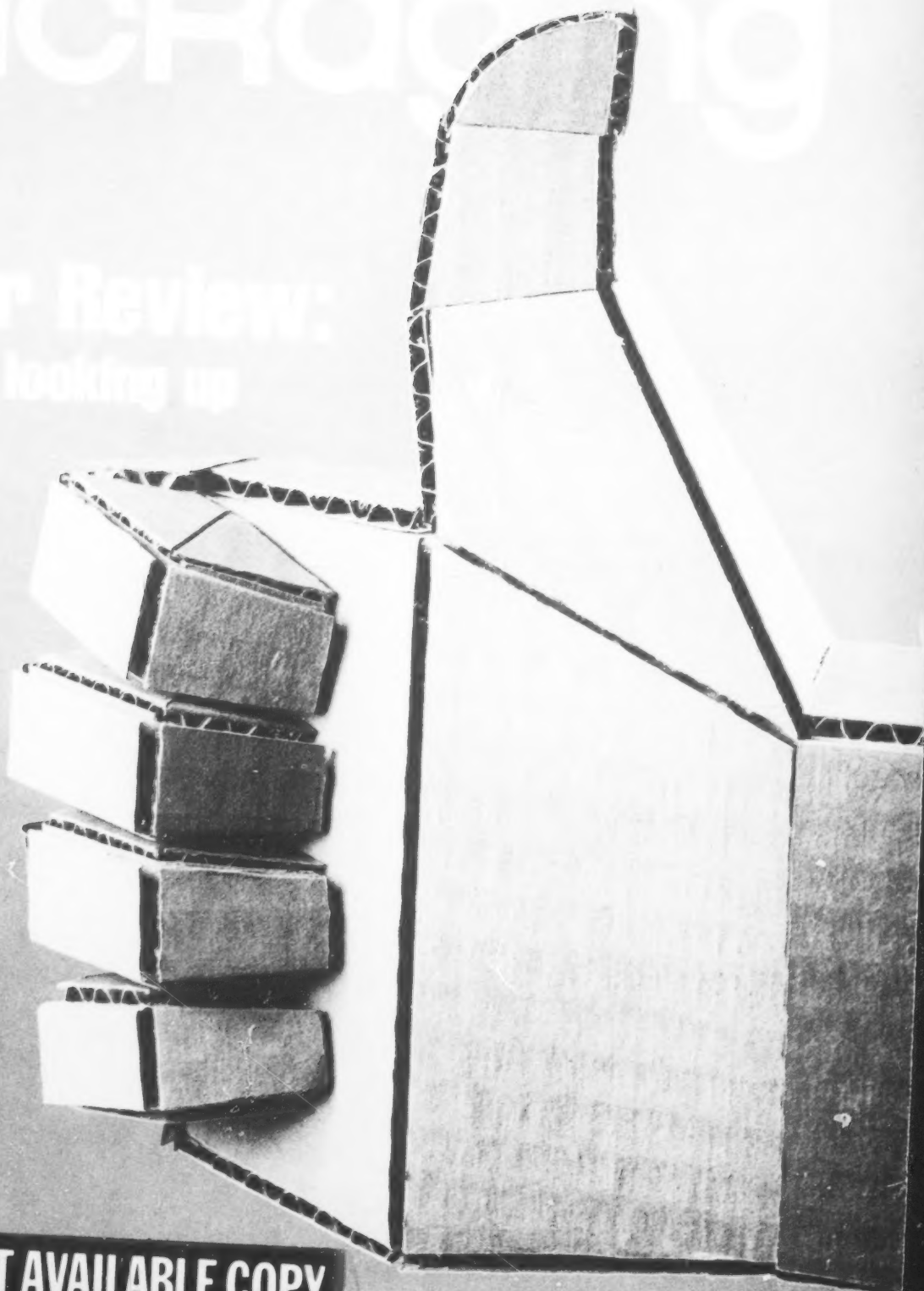
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**Midyear Review:**  
Things are looking up

**Rigid Box  
Winners**



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## on the cover

Although its constituents are not ready to expel a collective sigh of relief just yet, the paperboard converting industry is showing "thumbs up" with signs of renewed vigor, according to the experts in the Midyear Review beginning on page 22. (Cover design by Mary Hessing, photograph by Dick Brockman.)

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## features



### Midyear Review:

**Finally, Things Are Looking Up .....22**  
Will the upswing last long enough to enrich box plant coffers?  
The jury is still out.



**The Importance of People Is Never Passé.....30**  
Training and motivating people at all levels throughout an organization is more important today than ever before.

*by Loren F. Ashwood*



**Rigid Boxes, Folding Cartons Garner Awards .....32**  
Committee organizers and contest judges were surprised at the quality and quantity of entries in the 33rd Annual Paper Box Competition sponsored by the National Paperbox & Packaging Association.



**FTA Awards Reflect High Pressmanship Quality .....42**  
A large number of winning entries were printed with photopolymer plates.



**Sun and Sales Predominate at Scottsdale .....48**  
AICC'S Spring Meeting stressed the "how to" aspect of selling and sales meetings.

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July: Flexo Folder-Gluers/Coatings

August: Executive Salary Survey

September: Statistical Issue/TAPPI

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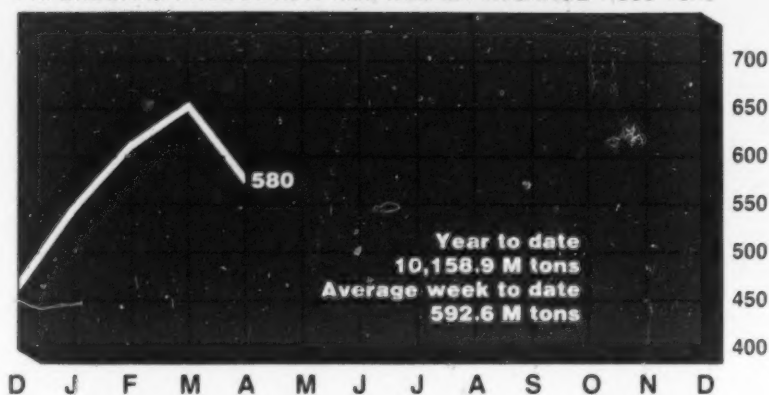
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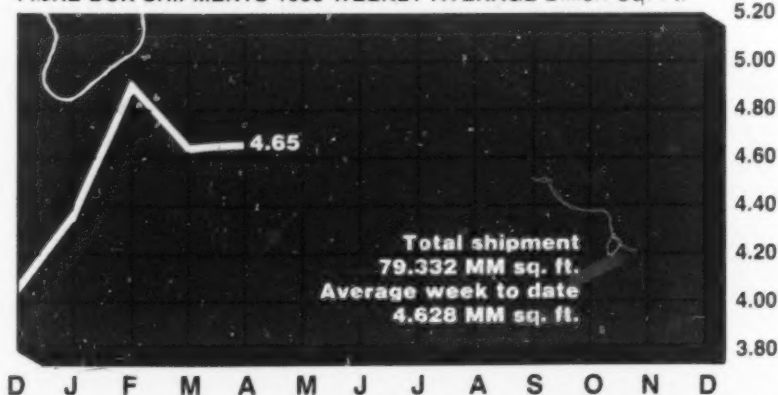
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

The year's first third ended with an average-week production 3.4% above 1982, which had been 7.1% below 1981, illustrating that the economic upturn has not yet reached "normal" earlier levels. During the April month, production volume was up 0.9% from '82—indicating a narrowing of earlier margins. Tonnage of containerboards was higher by 2.7%, with boxboards 4.0% down, as projected from the American Paper Institute's "production by furnish" data. This trend cannot be seen as portraying any sustained business surge.

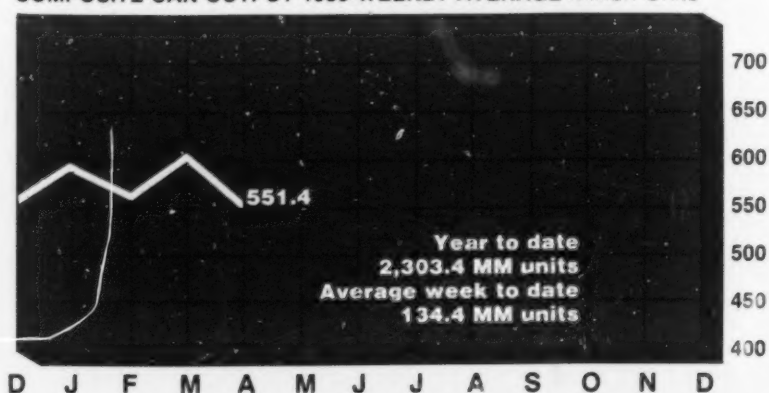
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

In April, 2483.6M tons of board output made 1831.8M of containerboard types, up only 9% from the 1972 months, along with 651.8M tons of boxboards, 4% below both '82 and April of 10 years ago. This illustrates the effect upon "carton" boards, not only of current economic stress but of long-term inroads by alternate packaging forms and materials. Fibre container boards, by contrast, are also vulnerable to current economics but have no long-term competitors for shipping-container usage, and as are relatively "at ease."

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Through the first four months of 1983, "set-up" box billings were down 3% from '82, which had been about even with '81, which had been up 10% from 1980, for major box producers reporting National Paperbox & Packaging Association. The usual great variations appear, with monthly extremes ranging from plus 120% in one locality to minus 60% in another. Generally, orders continue to lag in the mid-country areas, beset by automobile and construction stagnation, while relatively flourishing in metropolitan sectors.

# paper board packaging

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July 1983

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## Focus on Flexo Folder-Gluers

volume 68, no. 7

**July 1983**

**HB** A HARCOURT BRACE JOVANOVIICH PUBLICATION



### on the cover

This issue focuses on flexo folder-glue. Our international roundup, as well as two other features about recent U.S. flexo installations, highlight current technology in this area. (Photo courtesy of Ward Machinery Co.)

## features



#### **Independent Sheet Plant Soars**

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Emphasis on package design and engineering, along with filling specific needs with right equipment, makes the difference.



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*by Robert Gitlin*



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### EDITORIAL OFFICES

**Paperboard Packaging**  
7500 Old Oak Boulevard  
Cleveland, OH 44130  
216-243-8100  
Telex: 968918

**Europe**  
HBJ Publications  
24-28 Oval Road  
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### MARKETING SALES OFFICES

**Eastern**  
Ralph D. Wheeler  
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Minato-ku, Tokyo, 105 Japan  
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## COMING

August: Executive Salary Survey

September: Statistical Issue/CMM/TAPPI

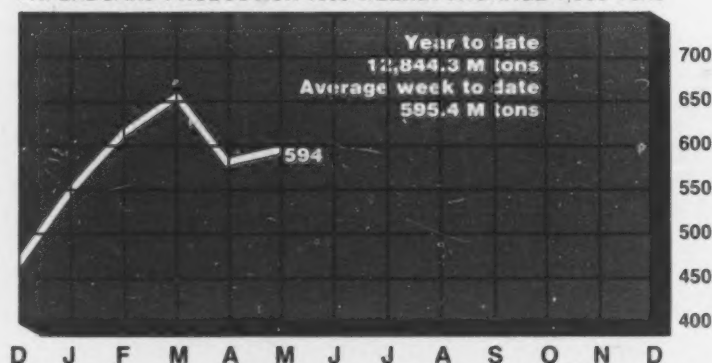
October: Computers/AICC

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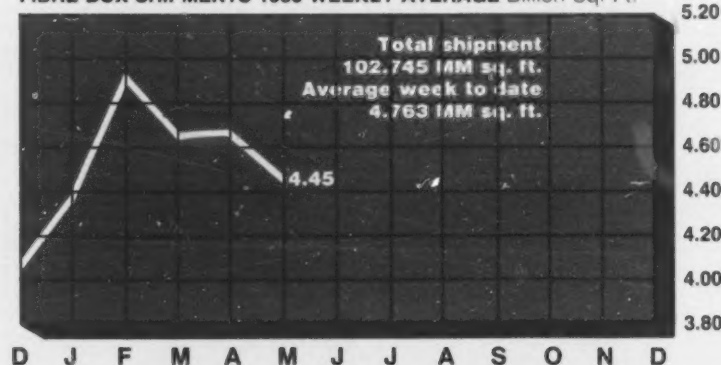
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



### PAPERBOARD MILL OPERATIONS:

The 1983 average week saw 595,400 tons produced as of May-end. This was an increase of 2.9% from that time 1982, which had been 8.5% down from '81. However, the rate of improvement over '82 has slowed in the latest third of this year's 21 weeks to May-end. Overall output was down 2% from the previous (second) seven-week period, comprising a drop of 2.3% in unbleached kraft furnish and of 4.9% in recycled, along with increases of 1/2% in semichemical and 1% in solid bleached, together with sharp rises in waterpaper prices.

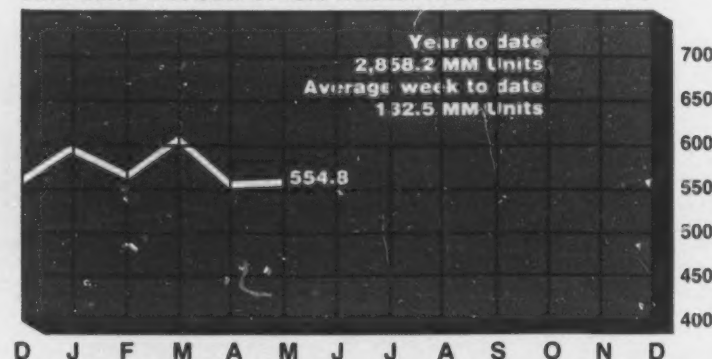
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



### PAPERBOARD-TYPE PRODUCTION:

May produced 2629.2M tons of paperboard, up 2.8% from the '82 month, which had been down 9.5% from '81. Containerboards tonnage of 1992.0M was 3.2% up from last year, which had been 10.3% down from '81. The rise was 2.1% for boxboard grades, to 707.2M tons; last year had been 7.2% below the 1981 month. While the year's containerboard/boxboard tonnage ratio has returned to the 2.7-1 stage, this is a far cry from the "normal" 2-1 of earlier years, and appears to presage a permanent decline in boxboard packagings.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



### RIGID PAPER BOXES:

Recovering from early months of 1983, set-up box billings have risen steadily above last year's sales, which had been 8% below 1981. Thus, nearing mid-year, a majority of the eight geographical regions set by the National Paperbox & Packaging Assn. are above '82 volume. However, these are chiefly in the Midwestern sector, where double-digit improvements offset sharp declines on both seacoasts. The rise is due entirely to increase in unit ton-value, since the produced tonnage of rigid boxes continues to decline.

August 1983

# paper board packaging

**EXECUTIVE  
SALARY  
SURVEY:**

**Folding and  
Corrugated**

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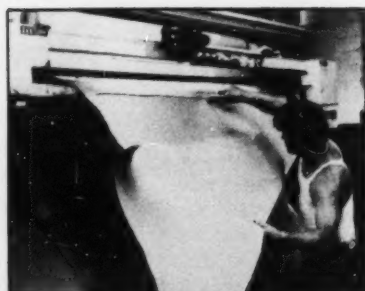
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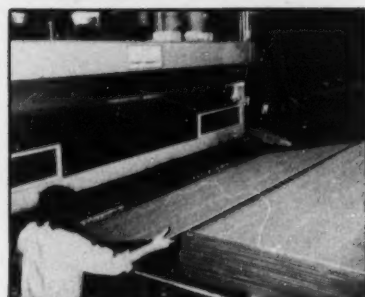
*Paperboard Packaging* gives the results of its first executive salary survey. Story begins on page 24.  
(Cover design by Beth Travis-Betts. Photography by Dick Brockman.)



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## EQUIPMENT UNVEILING

Recent open houses show how two major folding carton machinery manufacturers can help them stay ahead of the pack.

## MEETINGS & CONVENTIONS

*By Mark Arzoumanian*

Second such meeting, sponsored by FEFCO, gives converters opportunity to learn about and exchange latest technology.

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Visitors from around the world recently toured a major corrugated plant during a machinery exposition.

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**Paperboard Packaging**  
7500 Old Oak Boulevard, Cleveland, OH  
44130 □ 216-243-8100 □ Telex: 968918

111 E. Wacker Drive, 17th floor Chicago, IL  
60601 ☐ 312-938-2335

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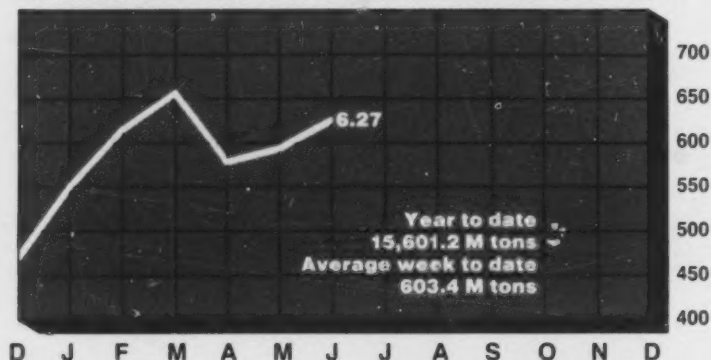
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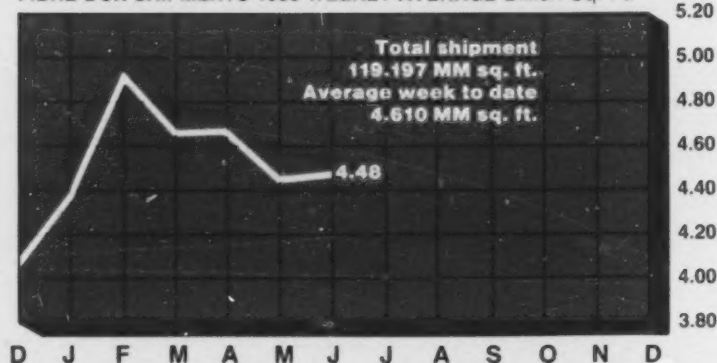
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



### PAPERBOARD MILL OPERATIONS:

The first half of 1983 ended with an average-week board output 5.5% ahead of the 1982 tonnage, which had been 8.5% below '81, which was up 3.2% from '80, after a drop of 1% in '80 from '79. So shifts the tempest. June's volume of 2687.6 M tons was up 9.6% from last year's month, an accelerating rate of rise, since at first-quarter end the margin was less than 4%. The fortunes of containerboard demand vs. boxboards is more marked than ever before, with a full 3-to-1 ratio in June—half-again above the former standard 2-to-1.

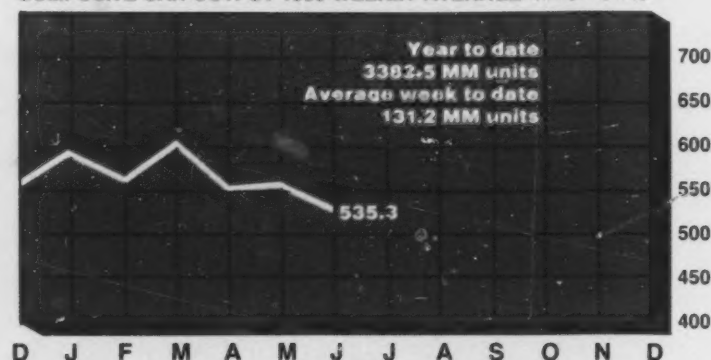
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



### PAPERBOARD-TYPE PRODUCTION:

In June, the output comprised some 2006.2 M tons of containerboard and 681.4 M of boxboards, as projected on basis of historic proportions from the API's reported "furnish" tonnages. The former grades were up 11.3% from 1982's month, and the latter by 6.6%, though the increase for unbleached kraft furnish (linerboard) is far above that for semichemical medium. This suggests that much of the liner production is going elsewhere than into domestic container conversion, since fibre box shipments are now about even with last year.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



### RIGID PAPER BOXES:

Through the first six months of 1983, rigid paper set-up box billings reported by members to the National Paperbox & Packaging Association varied wildly, with some areas showing double-digit improvements over 1982 in one month and deficits the next, and with some showing increases of more than 100% while other were down. It may be that this denotes some permanent evolution, since set-up boxboard consumed in 1982 was at its lowest ebb in reported history, down by 47% from 1972, by 52% from '62, and by 65% from '52.



*Paperboard Packaging* surveys boxmaking personnel throughout the United States and comes up with some interesting results.

## Executive Salary Survey: How Do You Stack Up?

by Mark Arzoumanian  
Editor

**"H**ow much do you make?" is the type of question that will inevitably get two types of responses from most people: a) none of your business; or b) an exaggeration.

Although it is considered rude to ask such a blunt question, the need to know (for whatever reason) has always been powerful.

With this in mind, *Paperboard*

decided it would be of great reader interest to conduct (to its knowledge) the first Executive Salary Survey of corrugated container and folding carton plant personnel in the United States.

Using the Fall 1982 *Official Container Directory* as a source, in early May a total of 534 questionnaires was sent out to executives of both independent and integrated corrugated and folding carton plants throughout the country. A total of

126 plant executives responded, for an excellent return rate of 23.6%. Those receiving the questionnaires were assured that "the information gathered would not be used in any other manner than what it is intended for in the first place," and *Paperboard Packaging* did not ask the respondent to identify himself or his company in any way whatsoever. Obviously, accurate responses were a must if the survey was to be valid and of use to the

### Integrated Corrugated Box Plants

#### Percent of responses

|                                                                |    |
|----------------------------------------------------------------|----|
| 1982 sales volume was                                          |    |
| (a) less than \$250,000                                        | 0  |
| (b) \$250,000-\$750,000                                        | 11 |
| (c) \$750,000-\$2 million                                      | 0  |
| (d) more than \$2 million                                      | 89 |
| Total number of employees is                                   |    |
| (a) less than 25                                               | 0  |
| (b) 25-50                                                      | 11 |
| (c) more than 50                                               | 89 |
| 1982 president/chief executive officer earned a base salary of |    |
| (a) up to \$50,000                                             | 0  |
| (b) \$50,000-\$75,000                                          | 25 |
| (c) \$75,000-\$100,000                                         | 12 |
| (d) more than \$100,000                                        | 63 |
| 1982 vice president earned base salary of                      |    |
| (a) up to \$40,000                                             | 0  |
| (b) \$40,000-\$60,000                                          | 12 |
| (c) \$60,000-\$80,000                                          | 25 |
| (d) more than \$80,000                                         | 63 |

#### Base salary earnings/percent of responses:

|                         | \$20,000<br>-\$30,000 | \$30,000<br>-\$40,000 | \$40,000<br>-\$50,000 | \$50,000<br>-\$60,000 | More than<br>\$60,000 |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1982 general manager    | 0                     | 0                     | 0                     | 40                    | 60                    |
| 1982 plant manager      | 0                     | 8                     | 42                    | 42                    | 8                     |
| 1982 production manager | 10                    | 10                    | 50                    | 20                    | 10                    |

The average total compensation for sales managers in 1982 was \$52,000.

### Independent Corrugated Box Plants

#### Percent of responses

|                                                                |    |
|----------------------------------------------------------------|----|
| 1982 sales volume was                                          |    |
| (a) less than \$250,000                                        | 0  |
| (b) \$250,000-\$750,000                                        | 1  |
| (c) \$750,000-\$2 million                                      | 30 |
| (d) more than \$2 million                                      | 69 |
| Total number of employees is                                   |    |
| (a) less than 25                                               | 25 |
| (b) 25-50                                                      | 32 |
| (c) more than 50                                               | 43 |
| 1982 president/chief executive officer earned a base salary of |    |
| (a) up to \$50,000                                             | 26 |
| (b) \$50,000-\$75,000                                          | 25 |
| (c) \$75,000-\$100,000                                         | 19 |
| (d) more than \$100,000                                        | 30 |
| 1982 vice president earned base salary of                      |    |
| (a) up to \$40,000                                             | 35 |
| (b) \$40,000-\$60,000                                          | 31 |
| (c) \$60,000-\$80,000                                          | 19 |
| (d) more than \$80,000                                         | 30 |

#### Base salary earnings/percent of responses:

|                         | \$20,000<br>-\$30,000 | \$30,000<br>-\$40,000 | \$40,000<br>-\$50,000 | \$50,000<br>-\$60,000 | More than<br>\$60,000 |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1982 general manager    | 17                    | 33                    | 14                    | 24                    | 12                    |
| 1982 plant manager      | 49                    | 30                    | 16                    | 0                     | 5                     |
| 1982 production manager | 60                    | 35                    | 5                     | 0                     | 0                     |

The average total compensation for sales managers in 1982 was \$53,000.

### Integrated Folding Carton Plants

#### Percent of responses

|                                                                |      |
|----------------------------------------------------------------|------|
| 1982 sales volume was                                          |      |
| (a) less than \$250,000                                        | 0    |
| (b) \$250,000-\$750,000                                        | 50   |
| (c) \$750,000-\$2 million                                      | 0    |
| (d) more than \$2 million                                      | 50   |
| Total number of employees is                                   |      |
| (a) less than 25                                               | 33   |
| (b) 25-50                                                      | 0    |
| (c) more than 50                                               | 67   |
| 1982 president/chief executive officer earned a base salary of |      |
| (a) up to \$50,000                                             | 16.7 |
| (b) \$50,000-\$75,000                                          | 50   |
| (c) \$75,000-\$100,000                                         | 16.7 |
| (d) more than \$100,000                                        | 16.7 |
| 1982 vice president earned base salary of                      |      |
| (a) up to \$40,000                                             | 0    |
| (b) \$40,000-\$60,000                                          | 50   |
| (c) \$60,000-\$80,000                                          | 25   |
| (d) more than \$80,000                                         | 25   |

#### Base salary earnings/percent of responses:

|                         | \$20,000<br>-\$30,000 | \$30,000<br>-\$40,000 | \$40,000<br>-\$50,000 | \$50,000<br>-\$60,000 | More than<br>\$60,000 |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1982 general manager    | 25                    | 0                     | 25                    | 25                    | 25                    |
| 1982 plant manager      | 25                    | 25                    | 25                    | 25                    | 0                     |
| 1982 production manager | 20                    | 60                    | 20                    | 0                     | 0                     |

The average total compensation for sales managers in 1982 was \$45,000.

### Independent Folding Carton Plants

#### Percent of responses

|                                                                |    |
|----------------------------------------------------------------|----|
| 1982 sales volume was                                          |    |
| (a) less than \$250,000                                        | 0  |
| (b) \$250,000-\$750,000                                        | 6  |
| (c) \$750,000-\$2 million                                      | 17 |
| (d) more than \$2 million                                      | 77 |
| Total number of employees is                                   |    |
| (a) less than 25                                               | 23 |
| (b) 25-50                                                      | 42 |
| (c) more than 50                                               | 35 |
| 1982 president/chief executive officer earned a base salary of |    |
| (a) up to \$50,000                                             | 40 |
| (b) \$50,000-\$75,000                                          | 26 |
| (c) \$75,000-\$100,000                                         | 17 |
| (d) more than \$100,000                                        | 17 |
| 1982 vice president earned base salary of                      |    |
| (a) up to \$40,000                                             | 46 |
| (b) \$40,000-\$60,000                                          | 36 |
| (c) \$60,000-\$80,000                                          | 7  |
| (d) more than \$80,000                                         | 11 |

#### Base salary earnings/percent of responses:

|                         | \$20,000<br>-\$30,000 | \$30,000<br>-\$40,000 | \$40,000<br>-\$50,000 | \$50,000<br>-\$60,000 | More than<br>\$60,000 |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1982 general manager    | 20                    | 30                    | 35                    | 10                    | 5                     |
| 1982 plant manager      | 52                    | 31                    | 10                    | 7                     | 0                     |
| 1982 production manager | 48                    | 43                    | 9                     | 0                     | 0                     |

The average total compensation for sales managers in 1982 was \$55,000.

### Northeast U.S. All Plants

#### Percent of responses

|                                                                |      |
|----------------------------------------------------------------|------|
| 1982 sales volume was                                          |      |
| (a) less than \$250,000                                        | 0    |
| (b) \$250,000-\$750,000                                        | 7    |
| (c) \$750,000-\$2 million                                      | 27   |
| (d) more than \$2 million                                      | 66   |
| Total number of employees is                                   |      |
| (a) less than 25                                               | 17   |
| (b) 25-50                                                      | 21   |
| (c) more than 50                                               | 62   |
| 1982 president/chief executive officer earned a base salary of |      |
| (a) up to \$50,000                                             | 27   |
| (b) \$50,000-\$75,000                                          | 17   |
| (c) \$75,000-\$100,000                                         | 24   |
| (d) more than \$100,000                                        | 32   |
| 1982 vice president earned base salary of                      |      |
| (a) up to \$40,000                                             | 26.5 |
| (b) \$40,000-\$60,000                                          | 30   |
| (c) \$60,000-\$80,000                                          | 17   |
| (d) more than \$80,000                                         | 26.5 |

#### Base salary earnings/percent of responses:

|                         | \$20,000<br>-\$30,000 | \$30,000<br>-\$40,000 | \$40,000<br>-\$50,000 | \$50,000<br>-\$60,000 | More than<br>\$60,000 |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1982 general manager    | 15                    | 15                    | 9                     | 33                    | 28                    |
| 1982 plant manager      | 31                    | 24                    | 26                    | 13                    | 6                     |
| 1982 production manager | 45                    | 26                    | 19                    | 6                     | 4                     |

The average total compensation for sales managers in 1982 was \$52,000.

### North Central U.S. All Plants

#### Percent of responses

|                                                                |    |
|----------------------------------------------------------------|----|
| 1982 sales volume was                                          |    |
| (a) less than \$250,000                                        | 0  |
| (b) \$250,000-\$750,000                                        | 5  |
| (c) \$750,000-\$2 million                                      | 17 |
| (d) more than \$2 million                                      | 78 |
| Total number of employees is                                   |    |
| (a) less than 25                                               | 17 |
| (b) 25-50                                                      | 29 |
| (c) more than 50                                               | 54 |
| 1982 president/chief executive officer earned a base salary of |    |
| (a) up to \$50,000                                             | 22 |
| (b) \$50,000-\$75,000                                          | 28 |
| (c) \$75,000-\$100,000                                         | 19 |
| (d) more than \$100,000                                        | 31 |
| 1982 vice president earned base salary of                      |    |
| (a) up to \$40,000                                             | 27 |
| (b) \$40,000-\$60,000                                          | 35 |
| (c) \$60,000-\$80,000                                          | 16 |
| (d) more than \$80,000                                         | 22 |

#### Base salary earnings/percent of responses:

|                         | \$20,000<br>-\$30,000 | \$30,000<br>-\$40,000 | \$40,000<br>-\$50,000 | \$50,000<br>-\$60,000 | More than<br>\$60,000 |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1982 general manager    | 18                    | 23                    | 23                    | 18                    | 18                    |
| 1982 plant manager      | 38                    | 23                    | 19                    | 15                    | 5                     |
| 1982 production manager | 42                    | 33                    | 17                    | 5                     | 3                     |

The average total compensation for sales managers in 1982 was \$52,000.

## Salary Survey

continued

boxmaking industry. This, it is believed, has been achieved.

It should be noted that in order to make it as easy as possible for busy boxmaking executives to respond to this salary survey, *Paperboard Packaging* gave salary ranges under each title.

The eight tables that accompany this article are self-explanatory. They are broken down into the following categories: corrugated box plants (integrated and independent), folding carton plants (integrated and independent) and all plants (integrated and independent/folding and corrugated) by geographic region. There are four regions: Northeast, North Central, Southeast, and Western.

### Noteworthy observations

Some observations worthy of note (although not at all surprising) include the fact that 63 percent of the president/chief executive officers of integrated corrugated box plants made over \$100,000 last

year while only 30 percent attained that level at independent plants.

Looking at folding carton plant percentages, the item of note is that the average total compensation for sales managers in 1982 is \$10,000 greater at independent plants.

Finally, looking at all plants by region, box plants in the West definitely pay the highest salaries, with the average total compensation for sales managers in that region a significant \$10,000 more than other region averages.

In addition to the information found in the tables, *Paperboard Packaging* posed three open-ended questions. The first asked: What factors do you take into consideration when deciding whether or not a particular salaried individual merits an increase? Responses included the following: performance, general wages in the area, productivity, the effort put forth, dedication, annual collective increases, attitude, company profitability, work habits, progress against stated goals, ingenuity, attendance, years of service, time since last raise, loyalty, growth potential, accuracy, diligence,

what the competition can pay the employee, the cost of living, the employee's workload, inflation, and leadership capabilities. These answers held true for all plants, whether independent or integrated, corrugated or folding carton.

Next, those surveyed were asked if they find that salaries the company has been paying over the past couple of years have stabilized because of the recession or continue to grow at a steady rate. The vast majority of those responding stated that salaries have stabilized.

The third and final question was: Based upon conversations you have had with friends possessing similar job responsibilities in other industries, how do their salaries compare to those in the paperboard converting industry? Although the majority said that they did not know or could not say, those who had an opinion believe that salaries in the industries *Paperboard Packaging* covers are comparable while a smaller percentage said the salaries were lower when judged against similar jobs in other industries. □

#### Southeast U.S. All Plants

|                                                                | Percent of responses |
|----------------------------------------------------------------|----------------------|
| 1982 sales volume was                                          |                      |
| (a) less than \$250,000                                        | 0                    |
| (b) \$250,000-\$750,000                                        | 14                   |
| (c) \$750,000-\$2 million                                      | 21                   |
| (d) more than \$2 million                                      | 65                   |
| Total number of employees is                                   |                      |
| (a) less than 25                                               | 28                   |
| (b) 25-50                                                      | 24                   |
| (c) more than 50                                               | 48                   |
| 1982 president/chief executive officer earned a base salary of |                      |
| (a) up to \$50,000                                             | 39                   |
| (b) \$50,000-\$75,000                                          | 25                   |
| (c) \$75,000-\$100,000                                         | 7                    |
| (d) more than \$100,000                                        | 29                   |
| 1982 vice president earned base salary of                      |                      |
| (a) up to \$40,000                                             | 31                   |
| (b) \$40,000-\$60,000                                          | 23                   |
| (c) \$60,000-\$80,000                                          | 23                   |
| (d) more than \$80,000                                         | 23                   |

#### Base salary earnings/percent of responses:

|                         | \$20,000-\$30,000 | \$30,000-\$40,000 | \$40,000-\$50,000 | \$50,000-\$60,000 | More than \$60,000 |
|-------------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| 1982 general manager    | 0                 | 26                | 16                | 21                | 37                 |
| 1982 plant manager      | 31                | 19                | 19                | 23                | 8                  |
| 1982 production manager | 24                | 29                | 33                | 9                 | 5                  |

The average total compensation for sales managers in 1982 was \$50,000.

#### Western U.S. All Plants

|                                                                | Percent of responses |
|----------------------------------------------------------------|----------------------|
| 1982 sales volume was                                          |                      |
| (a) less than \$250,000                                        | 0                    |
| (b) \$250,000-\$750,000                                        | 14                   |
| (c) \$750,000-\$2 million                                      | 5                    |
| (d) more than \$2 million                                      | 71                   |
| Total number of employees is                                   |                      |
| (a) less than 25                                               | 9                    |
| (b) 25-50                                                      | 22                   |
| (c) more than 50                                               | 69                   |
| 1982 president/chief executive officer earned a base salary of |                      |
| (a) up to \$50,000                                             | 9                    |
| (b) \$50,000-\$75,000                                          | 9                    |
| (c) \$75,000-\$100,000                                         | 23                   |
| (d) more than \$100,000                                        | 59                   |
| 1982 vice president earned base salary of                      |                      |
| (a) up to \$40,000                                             | 11                   |
| (b) \$40,000-\$60,000                                          | 21                   |
| (c) \$60,000-\$80,000                                          | 21                   |
| (d) more than \$80,000                                         | 47                   |

#### Base salary earnings/percent of responses:

|                         | \$20,000-\$30,000 | \$30,000-\$40,000 | \$40,000-\$50,000 | \$50,000-\$60,000 | More than \$60,000 |
|-------------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| 1982 general manager    | 6                 | 6                 | 11                | 33                | 44                 |
| 1982 plant manager      | 12                | 21                | 33                | 29                | 44                 |
| 1982 production manager | 23                | 41                | 23                | 9                 | 5                  |

The average total compensation for sales managers in 1982 was \$62,000.



# paper board packaging

September 1983

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## ANNUAL STATISTICAL ISSUE

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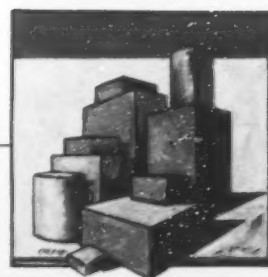
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# paper board packaging

SEPTEMBER 1983 VOLUME 68, NO. 9

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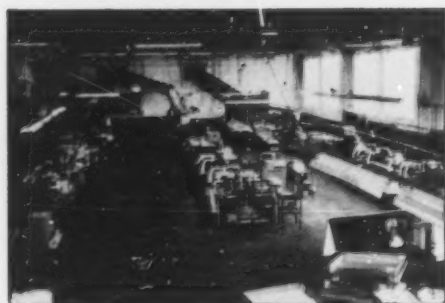
The most complete single compilation of statistical data on the paperboard industry is again presented in our annual statistics issue, starting on page 30. Cover design by Forrest Plesko



## FEATURES

| Year | Paperboard | %    | Pa   |
|------|------------|------|------|
| 1942 | 6,510,200  | 48.0 | 8.8  |
| 1952 | 12,225,600 | 50.1 | 12.1 |
| 1962 | 19,647,275 | 52.2 | 18.0 |
| 1972 | 31,041,700 | 52.2 | 28.4 |
| 1973 | 32,815,100 | 53.1 | 29.0 |
| 1974 | 30,087,800 | 50.6 | 29.4 |
| 1975 | 26,673,100 | 51.0 | 25.5 |
| 1976 | 29,024,800 | 51.3 | 27.5 |
| 1977 | 31,689,000 | 52.1 | 29.0 |
| 1978 | 34,337,000 | 55.3 | 27.7 |
| 1979 | 35,641,000 | 55.4 | 28.7 |
| 1980 | 35,862,000 | 55.4 | 28.9 |

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Folding carton plant makes sure that it remains in step with latest equipment and technological developments.

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Counter dies are made completely on machine, eliminating individual operation errors.

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Plant workers have responded enthusiastically to a company crusade against lost-time accidents.

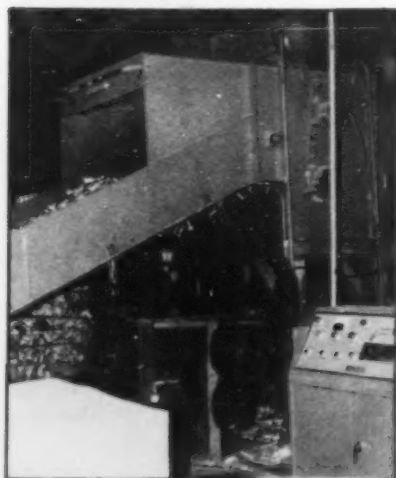
(continued on page 6)

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## FEATURES *continued*



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Proper balance of corrugator heat levels is neglected by a lagging steam system technology.

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Crane Carton no longer has floors filled with scrap at the end of a shift.

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When Tecumseh Corrugated Box Co., Cleveland Division, stopped having to order diecuts outside the plant, productivity zoomed.

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October: Computer Software/AICC

November: Look at Presses

December: 1984 Calendar

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## Editorial Offices

### Paperboard Packaging

7500 Old Oak Boulevard, Cleveland, OH 44130 □ 216-243-8100 □ Telex: 968918  
111 E Wacker Drive, Chicago, IL 60601 □ 312-938-2351  
757 Third Avenue, New York, N.Y. 10017 □ 212-888-3898 □ Telex: 968918

### Official Board Markets

111 E. Wacker Drive, 17th floor Chicago, IL 60601 □ 312-938-2351

### Europe

HBJ Publications, 24-28 Oval Road, London NW1 7DX □ Telex: 25775

### Marketing Sales Offices

#### Eastern

Ted Vilardi Jr. □ 757 Third Avenue, New York, N.Y. 10017 □ 212-888-3898 □ Telex: 968918  
Ralph D. Wheeler □ 757 Third Avenue, New

York, N.Y. 10017 □ 212-888-3964 □ Telex: 968918

### Midwest & West Coast

Richard Perkins □ 111 E. Wacker Drive, Chicago, IL 60601 □ 312-938-2351

### Europe

Dee Wakefield □ HBJ Publications, 24-28 Oval Road, London NW1 7DX □ Telex: 25775

### Japan

Sumio Oka □ International Media Rep., Ltd., 2-29 Toranomon 1-chome, Minato-ku, Tokyo, 105 Japan, 502-0656 □ Telex: J22633  
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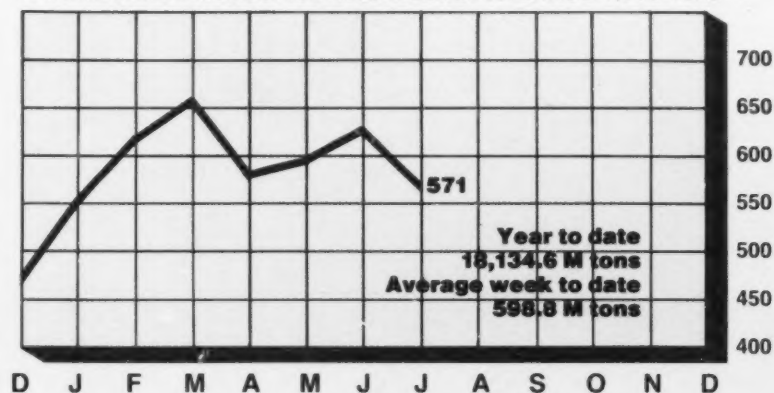
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# INDUSTRY STATISTICS

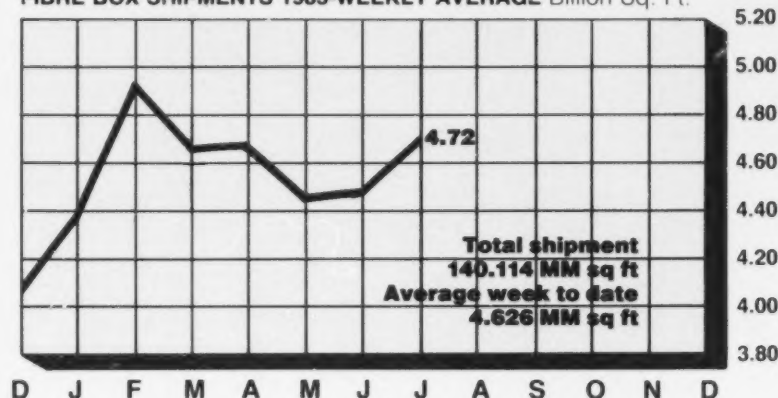
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1,000 Tons



## PAPERBOARD MILL OPERATIONS:

The first month of 1983's second half marked a continuation of the upturn in the second quarter. July's volume of 2529.0 M tons was up 23% from the 1982 month, which had been 23% down from '81, which had been up 8.4% from 1980. Thus, a return to traditional output levels seems to be appearing. This may be due in part to reduced downtimes for vacations and maintenance, because of improving business. However, board production and box conversion are varying vastly with region, as activity ranges from brisk in areas to relatively slow in farm industrial sectors.

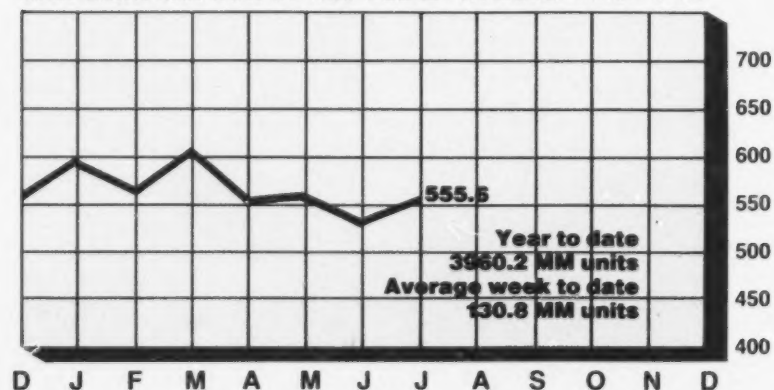
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



## PAPERBOARD-TYPE PRODUCTION:

In July, 1884.8 M tons of containerboard was up 25.3% from that month in 1982, while 644.2 M tons of boxboards reflected a 7.7% rise—both as projected from the API's "production by furnish" data. This devastating tonnage ratio of 3/1 compares with a traditional 2/1, and suggests that the overall packaging recovery is chiefly one of distance container shipments, rather than small-box business. Further, the July boxboard tonnage, though far up from '82, was in fact 2.3% below the volume of 1979 and 7.2% below '78, suggesting a long-term down-trend.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



## RIGID PAPER BOXES:

Through July, major set-up box-makers report a national rise of some 9% in total billings from 1982, compared with 8% over '81, 11% in '81 over '80, 7% in '80 over '79, 8% in '79 over '78, and 5% in '78 over '77. Thus, although the annual improvement in consistent, dollar-value of the rigid box market has not kept pace with inflation on a long-term basis. Again, the "point spread" is remarkable, between and among regional sectors, with advances above 30% in some areas and declines in others. This goes far to explain the reduction in number of "mom and pop" set-up boxshops.

*Will the recent recovery continue,  
or is it a blip in a long-term decline?*

## 1983 Is Mixed Bag Of Ups and Downs

by Fred Sharring  
Senior Editor  
*Paperboard Packaging*  
Editor  
Official Board Markets

**T**he year 1983 may well become remembered as embracing the widest range of business upheaval—from desperate recession to encouraging upturns—since the chopoff of the Great Depression in October 1929. Fortunately, in this case, the sequence is reversed.

This year was born into poverty. Major indicators—housing starts, auto sales, machine tool production, plant capacity utilization, and the like—had oozed to their lowest ebb for many decades.

In forest products/packaging, board production and package conversion were far down from years that had been rated unsatisfactorily in their time. Between mid-1982 and mid-'83, a dozen more folding carton plants shut down, bringing the total to 73 closings since the industry's high tide of 1977.

In the same 12 months, 51 more corrugated combiner and sheet plants closed, with the disappearance of 34 more producing companies. In January, this seemed a sort of industry swan song, after a half-dozen years of collapse that saw the net loss of 195 boxmaking plants and 206 firms.

And through it all gallops the run for cover from the eager diversification of earlier years. Whole divisions of mills and converting plants—cartons, composite cans, and what-not—sold piecemeal in exchange for the oncoming services field (insurance, finance, distribution, technical hardware) once so foreign to forest products.

It has not been a congenial time,

and now, even with beacons appearing all along the tunnel, some astute industry leaders wonder whether the best possibilities for recovery can ever again retrieve the former national lifestyle.

Can our "smokestack" industries ever again, at best, find room for all of those laid-off people? How many of them are simply superfluous? How many could, or

---

**Can our "smokestack" industries ever again, at best, find room for all of those laid-off people?**

---

should, be retrained for those more demanding new skills, when there is no shortage of well-grounded workers reported from the "high-tech" areas? Would it be easier all around to merely keep our growing excess of population on welfare? If so, how much of his own substance shall the typical worker be expected to contribute to the permanent non-worker?

Already, there is a more-than-solid stirring of national outrage, as the unorganized worker reads for the first time of the actual wage/benefit rates from which his organized counterpart is protesting the "giveback" in emergency labor contracts. These specifics were never published—before.

The \$16,000 school teacher is suddenly less than happy with the news that an assistant postal clerk may be making \$28,000—and the cost of a first-class mailing is about to go up again. The middle-class office worker, stuck with his dollar-a-ride-or-walk option, lately learns that the bus driver is making \$35,000.

The family head, wearily tuning

up his worn-out clunker for another year because he can't both buy food and pay \$10,000 for a new car, now hears that the "giveback" contract being protested by indignant auto workers involves a temporary cutback from \$48,000 to \$42,000 in average wages and benefits.

That is becoming a most polarizing public awareness of imbalance, and will remain so regardless of strength of economic upturn. It is at last penetrating the national mind that, with a gross national product expansion of 3% or less, the only way a Teamster or a Paperworker can get his 15% wage increase is by taking it out of my pocket—not his employer's. The time may be coming, very soon, when a stunned U.S. industry will wonder wistfully how it ever could have thought that improved capacity utilization was a social problem worth consideration.

It remains to be seen whether this recent-months recovery will continue, or is just a blip in a long-term decline.

In 1945 the U.S. industry made up half of the capitalist world's economy. We only contribute a third of it now, and our standing is predicted to drop to less than a fifth by the year 2000. We are seeing a gradual reduction in the economic privilege that provided our years of glory.

We must now compete against skilled foreign producers, without benefit of our former vast subsidy of cheapest energy and most abundant raw materials. We very likely will do this under global social and political harassment.

Paperboard packaging, in many forms, at least will have the advantage of renewable raw materials, with little significant competition



## Statistics *continued*

on the horizon. However, it cannot be predicted what the volume of market will become, in a revising economy.

An industry leader has said: "The challenge is ours to develop new products that will open new markets, to help bring about the political changes which will make American industry more productive, and to understand and harness the new technologies which are at our doorstep."

Surely that must be the very minimum needed. And yet even this minimum is still receiving the disservice of widespread withdrawal from joint activities and shared progress.

If the industry is to remain recognizable, that parochialism must be reversed, somehow. Then there will be time for the questions of whether and how well even the strongest renewal of joint campaign effort can halt the deterioration.

## '82 U.S. Production Down from '81 All-Time High

### Paperboard in the General Economy

**Table A-1:** Total U.S. production of paper and paperboard in 1982 was down 6% from the all-time high of '81. An unfortunate measure of our faltering economy is that the '82 volume was only 3.8% larger than that of 10 years ago, in 1972, though up by 64% from '62, by 153% from '52, and by 253% from tonnage of 40 years ago, in 1942.

Also regrettable is that this is the last year in which we will be able to combine data provided by U.S. federal agencies with information from this industry's associations. The new federal austerity stance we may approve, but it has withdrawn these data services.

Further, the federal withdrawal comes at the same time that the industry's own associations have scampered back toward isolation, largely limiting the findings of limited activities to their own guild membership.

A-1 — Board & Tonnage Relationship (tons)

| Year | Paperboard | %    | Paper      | %    | Total Paperboard and Paper | %     |
|------|------------|------|------------|------|----------------------------|-------|
| 1942 | 8,510,200  | 48.9 | 8,888,800  | 51.1 | 17,399,000                 | 100.0 |
| 1952 | 12,225,600 | 50.1 | 12,197,200 | 49.9 | 24,422,800                 | 100.0 |
| 1962 | 19,647,275 | 52.2 | 18,000,998 | 47.8 | 37,648,273                 | 100.0 |
| 1972 | 31,041,700 | 52.2 | 28,425,150 | 47.8 | 59,466,850                 | 100.0 |
| 1973 | 32,815,100 | 53.1 | 29,014,900 | 46.9 | 61,830,000                 | 100.0 |
| 1974 | 30,087,800 | 50.6 | 29,421,100 | 49.4 | 59,508,900                 | 100.0 |
| 1975 | 28,573,100 | 51.0 | 25,595,900 | 49.0 | 52,200,000                 | 100.0 |
| 1976 | 29,024,800 | 51.3 | 27,580,000 | 48.7 | 56,604,800                 | 100.0 |
| 1977 | 31,689,000 | 52.1 | 29,074,000 | 47.9 | 60,743,000                 | 100.0 |
| 1978 | 34,337,000 | 55.3 | 27,729,000 | 44.7 | 62,066,000                 | 100.0 |
| 1979 | 35,841,000 | 55.4 | 28,733,000 | 44.6 | 64,374,000                 | 100.0 |
| 1980 | 35,862,000 | 55.4 | 28,912,000 | 44.6 | 64,774,000                 | 100.0 |
| 1981 | 36,364,000 | 55.4 | 29,317,000 | 44.6 | 65,681,000                 | 100.0 |
| 1982 | 33,842,000 | 54.8 | 27,888,000 | 45.2 | 61,730,000                 | 100.0 |

Source: Bureau of Census and U.S. Pulp Producers Assn. Paperboard tons exceed classification of American Paper Institute in Paperboard Section of this issue through inclusion of certain boards not classified in institute figures

A-2 — Per Capita Production, Paperboard & Paper (pounds)

| Year | U.S. Population | Paperboard | Paper | Total Paperboard & Paper |
|------|-----------------|------------|-------|--------------------------|
| 1942 | 134,772,650     | 126.3      | 131.0 | 258.2                    |
| 1952 | 155,998,000     | 158.7      | 156.4 | 313.1                    |
| 1962 | 186,591,000     | 210.8      | 192.5 | 403.5                    |
| 1972 | 208,842,000     | 297.3      | 272.8 | 570.1                    |
| 1973 | 210,404,000     | 311.9      | 275.5 | 587.7                    |
| 1974 | 211,909,000     | 284.0      | 277.7 | 561.7                    |
| 1975 | 213,641,000     | 249.7      | 270.6 | 499.3                    |
| 1976 | 214,659,000     | 270.4      | 257.0 | 527.4                    |
| 1977 | 216,383,000     | 292.8      | 268.8 | 561.6                    |
| 1978 | 218,228,000     | 314.7      | 254.1 | 568.8                    |
| 1979 | 220,099,000     | 325.9      | 281.1 | 585.0                    |
| 1980 | 223,174,000     | 321.4      | 259.1 | 580.5                    |
| 1981 | 226,292,000     | 321.4      | 259.1 | 580.5                    |
| 1982 | 230,547,000     | 293.6      | 242.0 | 535.5                    |

Source: Based on Table A-1 and mid-year population estimate of Bureau of Census

**Table A-2:** The 535.5-lb share of U.S. paper and board output accruing to each citizen in 1982 was the lowest individual volume in a half-dozen years. Fluctuating years they have been, since the 1982 total is in fact lower than that of 10 years ago, and is higher than only two other years of that decade—ghastly 1975 and a barely recovered '76—though up by 33% from 1962, by 71% from '52, and by 107% from 40 years ago in '42.

A development to be noted is that in the past decade, per capita paperboard share went down only 1.2%, compared with an 11.3% drop for paper grades. From another view—of the total 34.6-lb decrease in per-citizen share between '72 and '82—89% was in paper grades.

**Table A-3:** During each average day of 1982, each average U.S. citizen accounted for nearly three paperboard containers of the basic types listed. And these do not

include other packagings such as an estimated 32 billion milk cartons—about 160 per person per year—along with various other specialty packages that bring individual consumption much higher.

A wide variation is evident, however, in the long-term expansion of these several basic types. Thus, since 1972, the daily unit consumption of fibre containers is up by 35%, folding cartons 7%, fibre can and tube packaging 58%, and fibre drums by 46%, while set-up box consumption is 9% down.

**Table A-4:** Total value of unconverted U.S. paperboards, though the second-highest in history, was down 2.5% from 1981 because of reduced tonnage. In inflated dollars, the value was up 186% from 1972, by 375% from '62, by 630% from '52, and 2100% from '42. Unit ton value in '82 was an all-time high.

These disparities may be



## Statistics *continued*

**A-4 — Paperboard Annual Tons & Values**

| Year | Tons       | Value (in billions) | Value Per Ton |
|------|------------|---------------------|---------------|
| 1942 | 8,510,200  | 500,768             | \$58.84       |
| 1952 | 12,225,600 | 1,539,575           | 125.93        |
| 1962 | 19,647,225 | 2,365,895           | 120.41        |
| 1972 | 31,041,700 | 3,919,639           | 126.27        |
| 1973 | 32,815,100 | 4,245,809           | 129.41        |
| 1974 | 30,087,800 | 4,715,070           | 152.70        |
| 1975 | 26,673,100 | 4,814,723           | 173.01        |
| 1976 | 29,024,800 | 5,518,022           | 190.11        |
| 1977 | 34,337,000 | 6,923,794           | 218.63        |
| 1978 | 35,641,000 | 7,629,681           | 222.20        |
| 1979 | 35,862,000 | 9,007,189           | 242.72        |
| 1980 | 36,364,000 | 10,335,428          | 288.20        |
| 1981 | 36,364,000 | 11,516,115          | 316.89        |
| 1982 | 33,842,000 | 11,229,643          | 331.83        |

Source: Tons and values are Bureau of Census. Tonnage figures vary from those of American Paper Institute through inclusion of certain boards not classified in Institute figures

attributed largely to recent-year "saturation" of the tonnage by high-priced boards. Thus, two-thirds of the total gain in average-dollar value over the past 20 years has appeared in the latest quarter of that period. Or—since 1972, a 9% rise in produced tonnage has seen a 163% increase in average value per ton. A good part of that rocketing must be due to general upgrading in boards consumed, rather than to such appreciation in direct value of the typical ton.

It remains to be seen how much longer this general upgrading can continue, in view of the exorbitantly rising costs of processing for visual effect alone, with no functional improvement.

Already, for example, the output of bleached sulfate pulps is falling below that of previous years, for the first time since that internationally beloved material became a significantly used grade a half-century ago.

**Table A-5:** In 1982 the total value of U.S. converted paperboard products was down 8% from '81, though up 112% in 10 years, by 313% in 20, by 530% in 30, and by 1356% in 40 years. This is only the second instance in four decades that total converted value was below the previous year. The other time was in badly depressed 1975.

In 1982, conversion processing added 59% to the value of its raw

**A-3 — Principal Paperboard Packages Used, Per Day & Per Year\***

M containers used per day

| Year                | Corrugated & Solid Fibre | Folding | Set-up | Cans & Tubes | Drums  | Total Per Day | M. Containers Total Per Year |
|---------------------|--------------------------|---------|--------|--------------|--------|---------------|------------------------------|
| 1942                | 11,520                   | 154,000 | 17,580 | 5,140        | 26     | 188,240       | 70,590,000                   |
| 1952                | 22,277                   | 272,900 | 19,300 | 15,570       | 71     | 330,118       | 120,494,000                  |
| 1962                | 33,905                   | 381,400 | 14,367 | 18,870       | 87     | 448,629       | 163,750,000                  |
| 1972                | 61,234                   | 481,178 | 14,964 | 49,440       | 137    | 806,953       | 225,188,300                  |
| 1973                | 65,888                   | 489,839 | 16,580 | 53,346       | 145    | 825,798       | 228,416,300                  |
| 1974                | 62,427                   | 482,337 | 14,689 | 56,360       | 153    | 815,966       | 224,829,700                  |
| 1975                | 56,175                   | 448,574 | 11,082 | 53,451       | 130    | 570,582       | 207,930,300                  |
| 1976                | 62,972                   | 488,496 | 12,068 | 59,705       | 151    | 623,392       | 227,694,000                  |
| 1977                | 66,123                   | 497,350 | 13,070 | 64,303       | 163    | 641,009       | 233,968,000                  |
| 1978                | 70,983                   | 515,254 | 14,168 | 66,983       | 176    | 667,174       | 243,685,300                  |
| 1979                | 76,121                   | 517,892 | 15,058 | 69,070       | 184    | 678,325       | 247,758,200                  |
| 1980                | 73,307                   | 505,453 | 14,671 | 67,296       | 188    | 660,915       | 241,234,000                  |
| 1981                | 74,757                   | 499,799 | 14,337 | 67,824       | 190    | 656,907       | 239,771,000                  |
| 1982                | 71,426                   | 491,318 | 13,584 | 66,234       | 192    | 652,907       | 238,292,000                  |
| 1982 Per Capita Use | 0.310                    | 2.131   | 0.051  | 0.287        | 0.0008 | 2.788         | 1,018                        |

\*Exclusive of certain sanitary containers.

**A-5 — Value of Principal Converted Paperboard Products Shipments**

| Year | Fibre Boxes    | Folding Cartons | Rigid Boxes  | Other Converted Board Products | Grand Total     |
|------|----------------|-----------------|--------------|--------------------------------|-----------------|
| 1942 | \$441,030,000  | \$214,289,500   | \$99,859,000 | \$164,100,000                  | \$1,228,342,800 |
| 1952 | 1,315,731,600  | 769,885,000     | 245,000,000  | 344,000,000                    | 2,837,495,700   |
| 1962 | 2,000,415,600  | 952,200,000     | 245,568,000  | 1,131,880,900                  | 4,330,064,500   |
| 1972 | 3,959,924,500  | 1,325,000,000   | 437,681,100  | 2,331,601,000                  | 8,054,206,500   |
| 1973 | 4,862,056,300  | 1,460,000,000   | 484,950,000  | 2,751,281,000                  | 9,558,287,300   |
| 1974 | 5,792,984,900  | 1,694,980,000   | 536,900,000  | 3,246,641,000                  | 11,271,505,900  |
| 1975 | 5,623,765,200  | 1,755,000,000   | 483,155,000  | 3,361,600,000                  | 11,223,520,200  |
| 1976 | 6,443,938,300  | 1,979,000,000   | 556,111,000  | 3,865,840,000                  | 12,844,889,300  |
| 1977 | 6,741,744,100  | 2,105,000,000   | 602,268,300  | 4,114,413,000                  | 13,563,425,400  |
| 1978 | 7,260,097,300  | 2,278,000,000   | 652,968,100  | 4,439,452,000                  | 14,631,406,200  |
| 1979 | 8,407,894,000  | 2,435,000,000   | 707,878,000  | 4,899,899,000                  | 16,450,471,000  |
| 1980 | 9,075,381,800  | 2,620,000,000   | 738,317,000  | 5,274,226,000                  | 17,707,924,800  |
| 1981 | 10,019,521,200 | 2,866,000,000   | 787,800,000  | 5,801,059,000                  | 19,474,380,200  |
| 1982 | 9,345,619,900  | 2,952,000,000   | 739,419,000  | 4,843,859,000                  | 17,878,890,800  |

Sources: Fibre Boxes, Fibre Box Assn.; Folding Cartons, Bureau of Census and Paperboard Council; Set-up Boxes, Bureau of Census and Natl. Paperbox & Packaging Assn.; Other, including cans, tubes, drums sanitary containers and die-cut paperboard, from Annual Survey of Mfrs.

**A-6 — Major Board Grade (tons)**

| Grades            | 1962              | 1972             | 1982             |
|-------------------|-------------------|------------------|------------------|
| Containerboard    | 9,299,000 47.3%   | 16,018,900 51.6  | 17,507,500 51.7  |
| Folding Boxboard  | 3,120,600 15.9    | 4,396,300 14.6   | 4,333,700 12.8   |
| Set-up Boxboard   | 523,800 2.7       | 455,100 1.5      | 223,600 0.7      |
| Milk/Food Board   | 1,620,800 8.2     | 1,699,600 5.5    | 1,283,700 3.8    |
| Building Board    | 1,876,000 9.5     | 3,006,200 10.0   | 2,062,900 6.1    |
| Cardboard         | 154,000 0.8       | 616,400 2.0      | 29,800 0.1       |
| Wet Machine Board | 162,000 0.9       | 135,900 0.5      | 118,200 0.3      |
| Miscellaneous     | 2,891,675 14.7    | 4,713,300 14.3   | 8,262,600 24.5   |
| Total             | 19,647,275 100.00 | 31,041,700 100.0 | 33,842,000 100.0 |

Source: Containerboard, folding rigid and special foodboards are as classified by American Paper Inst.; building board, cardboard, wet machine and total from Bureau of Census; miscellaneous is a balancing figure

materials (Table A-4), but 10 years ago the added value was 105%. This illustrates the recent-years' cost/price squeeze—the inevitable rise in materials cost, but the difficulty in getting corresponding price advances for packagings.

Value increases for individual products, over the decade, were:

fibre boxes 136%, folding cartons 123%, rigid boxes 69%, and other converted products 105%.

**Table A-6:** This summary for 1982 includes significant quantities of boards that are tabulated by the U.S. Bureau of Census but not by the American Paper Institute. To be

## Statistics *continued*

noted are the decade's drop of 70% in Building Board tonnage, owing to the slump in construction, and the near-doubling of the Miscellaneous volume proportion, though API volume is up only 12% in the 10 years.

**Table A-7:** Between 1972 and '82 the tonnage of fibrous raw materials consumed in U.S. paper and paperboard manufacture went up by some 5 million tons. Of this total, an amazing 88% was in virgin pulps. For the remainder, reclaimed paper had a relatively surviving time of it. But the use of other non-wood fibres is actually down 32% in the decade. These include the scrap textiles, the bagasse residue of sugar cane, short-fibre cotton linters, and the like, all of them available in good quality and significant volume.

## Wood Pulp Imports Are '82 Bright Spot

### Wood Pulp Review and Outlook

**Table B-1:** U.S. domestic pulp production in 1982 was down 3.5% from the all-time high of 1981, though up by 12.5% from 10 years ago, by 80% from 20 years ago, and by 188% in 30 years.

Imports, however, were near the

**A-7 — Tons of Fibrous Raw Materials Consumed in Paper and Board**

| Year | Pulp       | Paperstock | Other     | Total      |
|------|------------|------------|-----------|------------|
| 1942 | 11,884,800 | 7,003,400  | 1,280,500 | 20,168,700 |
| 1952 | 18,631,600 | 9,076,200  | 1,360,200 | 29,068,000 |
| 1962 | 28,433,000 | 9,173,300  | 910,400   | 38,516,700 |
| 1972 | 47,347,000 | 11,703,000 | 910,000   | 59,960,000 |
| 1973 | 48,899,000 | 12,374,000 | 883,000   | 62,156,000 |
| 1974 | 48,517,000 | 12,106,000 | 770,000   | 61,393,000 |
| 1975 | 44,668,000 | 10,345,000 | 708,900   | 55,721,900 |
| 1976 | 46,968,000 | 10,167,000 | 760,000   | 57,895,000 |
| 1977 | 46,704,000 | 11,071,000 | 723,000   | 58,498,000 |
| 1978 | 50,114,000 | 13,178,000 | 741,000   | 64,033,000 |
| 1979 | 53,057,000 | 12,874,000 | 772,000   | 66,703,000 |
| 1980 | 52,321,000 | 12,820,000 | 761,000   | 65,702,000 |
| 1981 | 53,054,000 | 13,382,000 | 714,000   | 67,150,000 |
| 1982 | 51,784,000 | 12,578,000 | 622,000   | 64,984,000 |

**Fibre Distribution of Average Furnish (Selected Years)**

| Year | Pulp | Paperstock | Other | Total  |
|------|------|------------|-------|--------|
| 1942 | 58.9 | 34.7       | 6.4   | 100.0% |
| 1952 | 64.1 | 31.2       | 4.7   | 100.0  |
| 1962 | 73.8 | 23.8       | 2.4   | 100.0  |
| 1972 | 79.0 | 19.5       | 1.5   | 100.0  |
| 1973 | 78.7 | 19.9       | 1.4   | 100.0  |
| 1974 | 79.2 | 19.5       | 1.3   | 100.0  |
| 1975 | 80.2 | 18.6       | 1.2   | 100.0  |
| 1976 | 81.1 | 17.6       | 1.3   | 100.0  |
| 1977 | 79.8 | 18.9       | 1.3   | 100.0  |
| 1978 | 78.3 | 20.6       | 1.1   | 100.0  |
| 1979 | 79.5 | 19.3       | 1.2   | 100.0  |
| 1980 | 79.6 | 19.2       | 1.2   | 100.0  |
| 1981 | 79.0 | 19.9       | 1.1   | 100.0  |
| 1982 | 78.7 | 19.4       | 0.9   | 100.00 |

Source: Bureau of Census

all-time high, up 15% in 10 years, by 54% in 20, and by 121% in 30. Exports have greatly exceeded those figures, of course, with the proliferation of industry in areas previously undeveloped. Overseas shipments of U.S. pulp in 1982 were higher by 57% than in '72, up 199% from '62, and by 1573% from '52.

This reflects the relatively dismal economic scene in many foreign places, where high and rising costs of materials are far above

those we find oppressing. In some non-oil-producing nations, the expenses of operation are so high that some products can be imported from the U.S., including freight, at significantly lower costs than they can be made at home from native or imported raw materials.

However, as may be seen in Table B-2, the volumes of both exports and imports vary greatly with type of pulp. When imports are added and exports subtracted from 1982 domestic pulp production, the new available tonnage, even in a recessive year, was up 11% from 1972, by 80% from '62, and 192% from '52.

**Table B-2:** High among the evident developments shown by these tabulations of major pulp grades is that U.S. exports of the internationally popular bleached kraft pulp neared another all-time record in 1982, while, as usual, exceeding the export tonnage of all other pulps combined. This popularity goes on, despite a domestic price rise of 155% over the past 10 years.

That cost increase is, of course, a consequence of increased processing expense due to the energy-price escalation, with its incessantly

**B-1- Total U.S. Pulp Production, Net Supply, Consumption & Inventories (M short tons)**

| Period | U.S. Produced | Imported | Exported | Net New Supply | Consumed in Board and Paper | Year End Inventory |
|--------|---------------|----------|----------|----------------|-----------------------------|--------------------|
| 1952   | 18,196        | 1,937    | 212      | 18,196         | 18,253                      | 711                |
| 1962   | 27,908        | 2,788    | 1,186    | 29,510         | 28,598                      | 787                |
| 1972   | 46,604        | 3,726    | 2,253    | 48,079         | 47,347                      | 606                |
| 1973   | 48,355        | 3,993    | 2,344    | 50,004         | 48,862                      | 678                |
| 1974   | 48,417        | 4,123    | 2,808    | 49,729         | 48,300                      | 931                |
| 1975   | 40,583        | 3,078    | 2,565    | 41,096         | 42,620                      | 1005               |
| 1976   | 47,173        | 3,703    | 2,518    | 48,358         | 48,968                      | 590                |
| 1977   | 46,858        | 3,864    | 2,640    | 48,082         | 46,704                      | 555                |
| 1978   | 50,375        | 3,975    | 2,590    | 51,755         | 50,114                      | 433                |
| 1979   | 53,225        | 4,382    | 2,791    | 54,816         | 53,057                      | 1759               |
| 1980   | 53,319        | 4,096    | 3,806    | 53,530         | 52,321                      | 448                |
| 1981   | 54,362        | 3,804    | 3,677    | 54,489         | 53,054                      | 672                |
| 1982   | 52,443        | 4,299    | 3,547    | 53,195         | 51,784                      | 618                |

Source: Dept. of Commerce and API



## Statistics *continued*

higher costs of making the bleaching chemicals, and of cooking the pulp in them.

The market appeal of bleached pulp is the visual appeal of its converted packagings in a highly competitive area of commerce. A measure of its proliferation is this: In 1972 the net supply of bleached plus unbleached kraft pulp was recorded as 32.7 million short tons, and the bleached portion was 46% of this. In 1982, the combined volume had expanded to 42.67 million tons, an increase of 30%. Of that additional new tonnage in the decade, 78% was in bleached pulp which thus represented more than half of the 1982 net supply, in competition with unbleached pulp for kraft linerboards.

Also visible here is the decline in tonnage of virgin sulfite pulp grades—in part because of their replacement by sulfates for some applications, and in part through

replacement by recycled white-paper furnishes, at relatively low cost. Thus in 1972 the sulfite pulps made up 6% of total net supply in the "principal" grades listed here. In 1982, the proportion has dropped by one-half, to 4% of the total. And of the additional new tonnage generated over that decade, 103% was in sulfate grades.

Predictably, the market price of the sulfite-substitute recycled white papers has gone up in response. Thus, mid-year 1972's mid-continent price for ordinary reclaimed news was \$20 per ton, while that of hard white shavings was \$80. At mid-1982, the news price had risen a seemingly formidable 50%, to \$30—but the price of the pulp-substitute shavings was up 130%, to \$185 per ton.

**Table B-3:** This, in broad terms, is where the pulp went. Rarely do any very startling events appear in consumption trends, beyond the year-to-year variations in overall economy. But not so the trends in

export of pulps, over three decades of Third World independence and industrialization.

Paper pulp is, of course, an uncomplicated raw material that can be made into a variety of widely used end products by means of basically simple processes with readily acquired skills. As such, it is tailor-made for beginning of self-sufficiency in non-manufacturing areas.

Thus, in 1952, exports of U.S. pulp totaled 212,000 tons, a mere 1% of the total consumption. By 1962, overseas shipments had increased nearly 600%, to 4% of consumption. In 1972, exports were 10 times those of 20 years previously, and in 1982 15 times greater than in '52.

From another view—domestic mill consumption of pulp in 1982 had gone up 10% in the latest decade, 80% in 20 years, and 192% in 30 years. But export tonnage has increased 60% in 10 years, 200% in two decades, and 1500% in three. And, since the overseas conditions

**B-2—U.S. Pulp Production, Net, Supply by Principal Paper Grades (M short tons)**

(Net supply equals imports plus domestic production minus exports)

| UNBLEACHED KRAFT |          |          |          |            | BLEACHED KRAFT |          |          |            | SEMIBLEACHED KRAFT |          |          |            |
|------------------|----------|----------|----------|------------|----------------|----------|----------|------------|--------------------|----------|----------|------------|
| Year             | Imported | Domestic | Exported | Net Supply | Imported       | Domestic | Exported | Net Supply | Imported           | Domestic | Exported | Net Supply |
| 1952             | 206      | 6,211    | 76       | 6,343      | 519            | 2,358    | 116      | 2,865      | 213                | 769      | 65       | 917        |
| 1962             | 237      | 4,517    | 102      | 9,651      | 1,237          | 6,784    | 397      | 7,623      | 507                | 2,213    | 223      | 2,497      |
| 1972             | 359      | 17,286   | 77       | 17,568     | 2,259          | 12,372   | 1,073    | 13,558     | 214                | 1,800    | 240      | 1,574      |
| 1973             | 368      | 17,580   | 71       | 17,877     | 2,500          | 13,228   | 1,032    | 14,696     | 189                | 1,826    | 80       | 1,744      |
| 1974             | 342      | 16,987   | 156      | 17,173     | 2,586          | 13,938   | 1,458    | 15,066     | 161                | 1,421    | 73       | 1,509      |
| 1975             | 190      | 15,227   | 96       | 15,301     | 2,132          | 12,756   | 1,379    | 13,509     | 104                | 1,375    | 87       | 1,384      |
| 1976             | 249      | 17,745   | 113      | 17,881     | 2,558          | 14,291   | 1,406    | 15,443     | 112                | 1,496    | 91       | 1,517      |
| 1977             | 245      | 15,399   | 104      | 18,540     | 2,588          | 14,887   | 1,369    | 16,106     | 138                | 1,538    | 89       | 1,587      |
| 1978             | 249      | 18,609   | 192      | 18,746     | 2,782          | 17,050   | 1,809    | 18,023     | 132                | 1,591    | 93       | 1,630      |
| 1979             | 258      | 19,391   | 199      | 19,450     | 2,935          | 17,987   | 1,908    | 19,014     | 137                | 1,651    | 97       | 1,691      |
| 1980             | 263      | 19,942   | 202      | 20,002     | 3,355          | 18,990   | 2,014    | 20,331     | 128                | 1,704    | 99       | 1,733      |
| 1981             | 305      | 21,133   | 215      | 21,223     | 3,611          | 20,008   | 2,048    | 21,571     | 119                | 1,816    | 96       | 1,839      |
| 1982             | 283      | 19,617   | 199      | 19,701     | 3,559          | 19,722   | 2,019    | 21,262     | 110                | 1,686    | 89       | 1,707      |

| UNBLEACHED SULFITE |          |          |          | BLEACHED SULFITE |          |          |          | SEMICHEMICAL |          |          |            |
|--------------------|----------|----------|----------|------------------|----------|----------|----------|--------------|----------|----------|------------|
| Year               | Imported | Domestic | Exported | Net Supply       | Imported | Domestic | Exported | Net Supply   | Domestic | Exported | Net Supply |
| 1952               | 432      | 674      | 35       | 1,071            | 499      | 2,398    | 75       | 2,881        | 829      | n.a.     | 829        |
| 1962               | 144      | 509      | 37       | 616              | 534      | 2,056    | 165      | 2,424        | 2,543    | n.a.     | 2,543      |
| 1972               | 100      | 333      | 2        | 431              | 323      | 1,796    | 227      | 1,892        | 3,761    | n.a.     | 3,761      |
| 1973               | 147      | 373      | 5        | 515              | 356      | 1,920    | 293      | 1,983        | 4,009    | 5        | 4,004      |
| 1974               | 121      | 390      | 28       | 483              | 451      | 1,914    | 286      | 2,079        | 5,789    | 18       | 3,771      |
| 1975               | 60       | 366      | 23       | 403              | 299      | 1,659    | 246      | 1,712        | 3,419    | 9        | 3,410      |
| 1976               | 76       | 460      | 12       | 524              | 360      | 1,748    | 181      | 1,925        | 5,138    | 4        | 5,134      |
| 1977               | 57       | 413      | 8        | 462              | 454      | 1,656    | 192      | 1,918        | 5,327    | 4        | 5,323      |
| 1978               | 45       | 329      | 8        | 386              | 453      | 1,429    | 166      | 1,716        | 5,627    | 10       | 5,617      |
| 1979               | 39       | 287      | 7        | 319              | 396      | 1,248    | 145      | 1,499        | 6,812    | 12       | 6,800      |
| 1980               | 32       | 365      | 7        | 390              | 372      | 1,449    | 137      | 1,684        | 7,946    | 14       | 7,932      |
| 1981               | 29       | 249      | 7        | 371              | 337      | 1,389    | 122      | 1,604        | 8,401    | 15       | 8,416      |
| 1982               | 33       | 394      | 8        | 419              | 304      | 1,254    | 110      | 1,448        | 7,920    | 14       | 7,906      |

Source: Bureau of Census, U.S. Department of Commerce, API. As of Jan. 1975, Census Bureau combines Soda data with Sulfate



## Statistics *continued*

that brought about this demand are likely to continue growing, the export market is likely to remain a valuable outlet.

**Table B-4:** The impact of violent mid-1970s escalation in world petroleum prices is readily traced in corresponding trends for paper pulps, as production costs soar.

For example, it is seen that between 1952 and '62, the ton price for each of these basic grades actually dropped, as manufacturing efficiencies improved. Then, between '62 and '72, the price of unbleached kraft pulp (largest single-volume grade) went up 22%, or a sedate 2.2% per year, while bleached kraft rose 13%. But between 1972 and '82 the price of both bleached and unbleached kraft pulp rose 155%—over 12 times greater than the increase over the decade previously.

In another view: the price of workhorse kraft pulp has increased by 193% over 30 years, and more than nine-tenths of that advance has developed in the latest 10 years.

Similarly, for the other pulp grades shown, the price shifts between 1952 and '72, and the changes since then, are, respectively: for unbleached sulfite, 1.4% and 146%; for bleached sulfite, 4% and 147%; for groundwood, -5% and -186%.

Informed projections are for further price increases averaging around 10% annually in the 1980s.

**B-3—Pulp Consumption by End-Uses (M short tons)**

| Year | Board & Paper Mills | Exports | Non-Paper Uses | Total  |
|------|---------------------|---------|----------------|--------|
| 1952 | 17,737              | 212     | 755            | 18,253 |
| 1962 | 28,598              | 1,186   | 976            | 30,760 |
| 1972 | 47,347              | 2,237   | 1,115          | 50,305 |
| 1973 | 48,862              | 2,344   | 1,146          | 52,352 |
| 1974 | 48,517              | 2,808   | 1,154          | 52,479 |
| 1975 | 42,620              | 2,565   | 783            | 45,968 |
| 1976 | 46,968              | 2,518   | 1,121          | 50,607 |
| 1977 | 46,704              | 2,640   | 1,097          | 50,441 |
| 1978 | 50,114              | 2,599   | 1,153          | 53,866 |
| 1979 | 53,057              | 2,791   | 1,222          | 57,070 |
| 1980 | 52,321              | 3,806   | 1,186          | 56,360 |
| 1981 | 53,054              | 3,677   | 1,137          | 57,868 |
| 1982 | 51,784              | 3,547   | 1,110          | 56,441 |

Source: Census Bureau, U.S. Dept. of Commerce, API

## Recovered Tonnages Continue at All-Time High

### Paperstock Review

**Table C-1:** The prompt sensitivity of secondary fibre supply/demand to industry economics is well illustrated in the recovery ratios of recent years. Total recovered tonnages in the latest three years have been at all-time highs, rising and falling precisely in tune with consumption in paper and board, and with identical recovery ratios, though these are far below the 27% ratios prevalent in the 1950s.

This sounds fairly uplifting until it is noted that, over the past 20 years of our greatest economic expansion, the consumption of paper and board went up 56%, but

only one-fifth of the additional material came from reclaimed fibres.

In another view: If all conservation concerns of the past 30 years had only produced a fibre recovery ration in 1982 merely equal to that in 1952, about 3 million additional tons of wastepaper would have been taken.

Thus, the '80s continue in frustration for those whose efforts to conserve usable materials have been directed toward both reduction of the solid waste stream and the recovery of resources. It shows again that an "aroused" public is not enough to overcome factors governing the marketplace.

One strongly encouraging trend, as for many other basic commodities, is that of export demand, which has begun to provide a new outlet for reclaimed paper that is beyond any dependable assessment at the moment.

Further, the expansion thus far is difficult to convey understandably by numbers. One effort would be to calculate that between 1972 and '82 the exported volume was six times greater than that in the 20 years before '72. Another view is that in 10 years the recovered volume went up 22%, while the exported tonnage rose 400%. Another is that in 1982 the overseas shipments exceeded the combined total tonnage in all years between 1952 and '72.

Informed industry economists project that in the absence of some international catastrophe, U.S. exports of paper stock by the end of this decade might well become greater than the total present recovered tonnage, and possibly greater by a considerable margin.

These paper stock receipts by  
(continued on page 44)

**B-4—Average Yearly North American Pulp Prices (Per Short Ton)**

| Year          | Unbleached Kraft | Bleached Softwood Kraft | Unbleached Sulphite | Bleached Sulphite | Groundwood |
|---------------|------------------|-------------------------|---------------------|-------------------|------------|
| 1952          | \$126.83         | \$160.19                | \$142.06            | \$153.61          | \$92.48    |
| 1962          | 118.54           | 140.37                  | 121.92              | 136.25            | 87.50      |
| 1972          | 145.00           | 160.00                  | 144.00              | 160.00            | 87.50      |
| 1973          | 180.00           | 192.00                  | 170.00              | 187.00            | 102.00     |
| 1974          | 185.00           | 295.00                  | 285.00              | 292.00            | 185.00     |
| 1975          | 335.00           | 353.00                  | 335.00              | 354.00            | 200.00     |
| 1976          | 335.00           | 365.00                  | 335.00              | 354.00            | 200.00     |
| 1977          | 335.00           | 365.00                  | 335.00              | 354.00            | 200.00     |
| 1978          | 335.00           | 365.00                  | 335.00              | 354.00            | 200.00     |
| 1979          | 365.00           | 400.00                  | 375.00              | 400.00            | 240.00     |
| 1980          | 365.00           | 432.00                  | 380.00              | 420.00            | 245.00     |
| 1981          | 425.00           | 465.00                  | 385.00              | 440.00            | 250.00     |
| 1982          | 442.00           | 470.00                  | 430.00              | 440.00            | 250.00     |
| 1983 1st half | 372.00           | 408.00                  | 354.00              | 395.00            | 250.00     |

Suppliers announced contract levels—not necessarily the actual selling price.

## Statistics *continued*

mills are augmented by significant tonnages entering into products such as roofing materials, molded pulps, wallboard facings, shredded insulation and other non-paper uses. Hence, the actual recovery ratio is a few points higher.

**Table C-2:** Mill consumption of reclaimed fibre in 1982 was down less than 1% from '81, and off 4.6% from 1978's all-time high, though up 8% from 10 years ago, 40% from 20 years, and 60% from 1952. Of the 1982 total, almost all was consumed.

This might seem to suggest that adequately limitless supplies are waiting in the wings of inventory to meet any increase in demand that might arise. That confidence may not be borne out, if occasion should appear.

Actually, the mill-inventory tonnages shown are not fully relevant, since suppliers' stocks are not reported to the compiling centers, though they remain available for mill demand. The desirability of a reporting service for those inventories may be seen in the wide fluctuations of boxboard demand.

It is not at all unusual for boxboard orders to vary nationally by hundreds of thousands of tons from one week to the next. Contending with this matter calls for either the maintaining of costly surplus inventories at mills or dealers, or both, or else a hasty short-leadtime scurrying about for extra supplies,

C-1 — Paper Stock Recovery vs. Board/Paper Consumption (M tons)

| Year | Board and Paper Consumption | Mill Paperstock Receipts | Exports | Total Recovered | Paperstock Recovery Ratio |
|------|-----------------------------|--------------------------|---------|-----------------|---------------------------|
| 1952 | 25,234                      | 7,815                    | 142     | 7,881           | 26.9                      |
| 1962 | 42,208                      | 9,076                    | 210     | 9,360           | 22.2                      |
| 1972 | 64,022                      | 11,703                   | 415     | 12,118          | 19.0                      |
| 1973 | 67,337                      | 12,254                   | 683     | 12,947          | 19.2                      |
| 1974 | 65,452                      | 12,438                   | 1,307   | 13,745          | 21.0                      |
| 1975 | 55,907                      | 10,228                   | 861     | 10,904          | 19.5                      |
| 1976 | 59,480                      | 10,206                   | 1,273   | 10,881          | 18.3                      |
| 1977 | 65,226                      | 10,279                   | 1,544   | 10,959          | 16.8                      |
| 1978 | 63,440                      | 13,191                   | 1,589   | 14,064          | 20.5                      |
| 1979 | 60,929                      | 12,985                   | 2,139   | 14,245          | 20.4                      |
| 1980 | 68,584                      | 12,712                   | 2,717   | 15,429          | 22.5                      |
| 1981 | 69,667                      | 13,480                   | 2,213   | 15,693          | 22.5                      |
| 1982 | 65,964                      | 12,670                   | 2,127   | 14,797          | 22.5                      |

Source: Bureau of Census Forest Products & Pkg. Div. BSDA

C-2 — Paper Stock Movements and Stocks (M short tons)

| Year | Mill Receipts | Mill Consumption | Mill Inventories | Imports | Exports |
|------|---------------|------------------|------------------|---------|---------|
| 1952 | 7,815         | 7,881            | 522              | 71      | 142     |
| 1962 | 9,076         | 9,075            | 571              | 67      | 210     |
| 1972 | 11,703        | 11,847           | 620              | 68      | 415     |
| 1973 | 12,264        | 12,374           | 516              | 87      | 683     |
| 1974 | 12,438        | 112,106          | 848              | 89      | 1,307   |
| 1975 | 10,228        | 10,345           | 731              | 72      | 861     |
| 1976 | 10,206        | 10,187           | 770              | 106     | 1,273   |
| 1977 | 10,279        | 11,071           | 723              | 148     | 1,544   |
| 1978 | 13,191        | 13,178           | 741              | 127     | 1,589   |
| 1979 | 12,985        | 12,871           | 584              | 170     | 2,139   |
| 1980 | 12,712        | 12,620           | 818              | 164     | 2,717   |
| 1981 | 13,480        | 13,382           | 979              | 137     | 2,213   |
| 1982 | 12,670        | 12,578           | 978              | 135     | 2,217   |

Source: Bureau of Census and U.S. Department of Commerce

or else a delay in filling orders—none of which is desirable.

One way to avoid this would be the cooperative establishment of regional supply centers, at which to maintain moderate inventories of those secondary grades most sub-

ject to wide fluctuation in demand—with the availability of these supplies reported to, and recorded by, a central agency for quick reference when stocks are suddenly needed. This plan has been considered before, and the trend of the industry's quick-service developments is increasing the likelihood of its being adopted, before very long.

**Table C-3:** A trend to be noted in these end-uses for reclaimed-fibre consumption is the marked increase in tonnage entering paper grades, compared with that going into paperboard and the miscellaneous products.

Specific comparisons are that since 1972 the total volume consumed rose by about 8%, and since 1962 by 40%. The tonnage recycled into paper grades 20 years ago was 13% of total; in 1982 it was 22%. But of the additional volume consumed in 1982 over '62, some 46% went into paper, rather than board/miscellaneous.

The increase in volume entering

C-3 — Consumption of Paperstock by End-Use (M short tons)

| Year | Paperboard Incl. Wet Machine | Paper Incl. Newsprint | Construction Grades, Molded Pulp and Other | Pulp Mills | Total   |
|------|------------------------------|-----------------------|--------------------------------------------|------------|---------|
| 1952 | 8,993.5                      | 1,757.2               | 734.5                                      | n.a.       | 7,881.2 |
| 1962 | 6,977.0                      | 1,179.7               | 899.0                                      | n.a.       | 9,075.0 |
| 1972 | 8,080.0                      | 2,438.0               | 1,693.0                                    | n.a.       | 11,847  |
| 1973 | 8,909.3                      | 2,608.5               | 856.2                                      | n.a.       | 12,374  |
| 1974 | 8,716.3                      | 2,841.3               | 745.4                                      | n.a.       | 12,106  |
| 1975 | 7,448.4                      | 2,172.5               | 147.0                                      | n.a.       | 10,345  |
| 1976 | 7,320.2                      | 2,195.1               | 711.7                                      | n.a.       | 10,206  |
| 1977 | 7,971.0                      | 2,324.9               | 775.1                                      | n.a.       | 11,071  |
| 1978 | 8,489.3                      | 2,767.3               | 822.7                                      | n.a.       | 13,178  |
| 1979 | 9,367.0                      | 2,802.8               | 701.2                                      | n.a.       | 12,871  |
| 1980 | 8,183.3                      | 2,748.1               | 889.5                                      | n.a.       | 12,620  |
| 1981 | 9,841.7                      | 2,945.1               | 595.2                                      | n.a.       | 12,620  |
| 1982 | 8,760.4                      | 2,798.2               | 588.4                                      | n.a.       | 12,578  |

Source: Census of Manufacturers, API Capacity Report  
n.a.—not available. \*API annual Capacity Survey, Nov. 1974



## Statistics *continued*

paper types may be attributed largely to rising use for recycled newsprint, as well as the diversion of much reclaimed news into cellulosic insulation materials.

Consumption in new newsprint is very likely to expand comfortably through the foreseeable future. A look at Garden State Paper Co., operating two 100,000-tons/day recycling mills in New Jersey and California, a similar-size joint venture mill in Chicago, and a 155,000-ton facility in Georgia, shows the economics of these mills are firmly based on rising production costs for virgin newsprint, with the recycled paper reported to be equal or preferable for machine handling and print surface.

The latter's raw material is abundant nationally at a price perhaps one-eighth that of the finished product. This margin is a dependable cushion against the ever-escalating process costs confronting primary newsprint mills.

However, the outlet for reclaimed news in cellulosic

C-4 — Ratio of Paperstock to Total Fibrous Materials Consumed in Board & Paper Production (M short tons)

| Year | Woodpulp | Paper Stock | Other Materials* | Total  | Paper Stock Percent of Total |
|------|----------|-------------|------------------|--------|------------------------------|
| 1962 | 18,631   | 7,881       | 1,300            | 29,088 | 31.2                         |
| 1962 | 28,598   | 9,075       | 963              | 38,636 | 23.5                         |
| 1972 | 47,947   | 11,703      | 892              | 59,942 | 19.5                         |
| 1973 | 48,899   | 12,374      | 883              | 62,156 | 20.0                         |
| 1974 | 48,300   | 12,106      | 827              | 61,233 | 19.7                         |
| 1975 | 42,820   | 10,345      | 587              | 53,552 | 19.3                         |
| 1976 | 46,968   | 10,167      | 760              | 57,895 | 17.6                         |
| 1977 | 46,704   | 11,071      | 627              | 58,402 | 19.0                         |
| 1978 | 50,114   | 13,178      | 741              | 64,033 | 20.6                         |
| 1979 | 53,057   | 12,871      | 723              | 66,651 | 19.3                         |
| 1980 | 53,421   | 12,620      | 566              | 66,529 | 19.0                         |
| 1981 | 57,054   | 13,382      | 1,056            | 67,492 | 19.8                         |
| 1982 | 51,784   | 12,578      | 622              | 64,984 | 19.4                         |

Compiled from Census Bureau Reports, API.  
\*Linter pulp, straw bagasse, etc.

insulation is also more favorable, with a potential estimated at perhaps 1 million tons per year.

The imposition of new national standards for quality has restored its reputation as a safe, low-cost product of satisfactory performance, and the renewed market for cellulosic insulation materials may be expected to expand.

The declining "other product" consumption—down 65% in the

decade—may be attributed largely to successful invasion by alternate materials in applications held earlier by molded pulp. An example is the foamed-plastic egg carton.

However, the fact that this decline has not been greater is due to rising use of paper in construction materials—observe the minimal tonnage consumed in depressed 1975. In any case, these "other" end uses are seen to take

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## Statistics *continued*

only about 5% of the reclaimed paper fibre.

**Table C-4:** The utilization of reclaimed fibre in manufacture of paper/board materials seems to have petrified at an average around 19% of ingredients.

It may be seen that although the actual tonnage of paper stock is up 23% from a decade ago, it cannot be called flourishing. Thus, of the increase since 1972, some 88% was in virgin woodpulp.

In short, a highly limited effect has been generated by the widely publicized recent-years' appeal for greater recovery of resources, and by the intensive research into utilization of non-wood fibres.

Those include the sugar-cane bagasse, banana stalks, linters clinging to cotton seeds after the first ginning, fast-growing grasses such as kenaf, and the like, along with a number of high-volume residues from ongoing industrial processes—not merely the agricultural products alternative to wood fibre.

The picture begins to appear that, as in the case of our natural gas and petroleum supplies, we will not turn to the available alternate paper fibre supplies until there is no other choice. And then that choice will be considerably less comfortable than it would have been in the days when it was voluntary.

**Table C-5:** These price ranges show the highs and lows, in the year ending mid-1983, for basic paper stock grades in representa-

### C-5 — Domestic Paperstock Price Ranges Per Ton — 1982-1983

Based on transactions during 1982 and Jan.-June 1983  
For current prices see Official Board Markets  
Mill prices F.O.B. cars or trucks. All prices in bales — bales 500. min.

|                                           | Jan. June<br>1982-1983<br>New York | Jan. June<br>1982-1983<br>Chicago | Jan. June<br>1982-1983<br>Southeast |
|-------------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|
| No. 1 Mixed Paper                         | \$5-7                              | \$7.50-15                         | \$5-15                              |
| No. 1 Baled News                          | 5-40                               | 25-45                             | 30-40                               |
| Old Corrugated Boxes                      | 10-50                              | 25-60                             | 20-60                               |
| Boxboard Clippings                        | 20-25                              | 25-35                             | 20-40                               |
| White Ledger                              | 60-75                              | 60-90                             | 55-65                               |
| <b>Dbl. Ld. Kraft Corr.<br/>Clippings</b> | <b>East</b>                        | <b>Midwest</b>                    | <b>Southeast</b>                    |
| Semichem .009 Medium                      | \$37.50-77.50                      | \$37.50-77.50                     | 40-80                               |
| Mixed .009 Medium                         | 32.50-72.50                        | 32.50-72.50                       | 35-75                               |
| Hard White Shavings                       | 180-210                            | 180-210                           | 180-210                             |
| Man. Tab. Cards                           | 220-255                            | 220-255                           | 200-255                             |
| White News Blanks                         | 65-90                              | 65-90                             | 65-90                               |

Source: Official Board Markets

tive areas, as reported to *Official Board Markets* by mills and dealers there.

The gradual fading of market demand, and thus of price, is evident here for such high-volume, formerly prominent grades as mixed paper, as compared with the high and rising prices of high-grade pulp substitutes.

The reason for both is the higher cost of processing. Recent-years' explosion in cost of energy, labor, and transport has elevated processing expense beyond the end-use value for these low-grade fibres. "Mixed paper," for example, is a heterogeneous mix which, given moderate sorting and cleaning, once provided an acceptable base for many low-grade end products. But low-cost is gone forever.

On the other hand, prices for the better qualities of generator scrap, such as need little or no processing before pulping, have been going up and up in multiples.

For example, 10 years ago the typical Chicago-area price for mixed paper was around \$12 per ton, with a \$77.50 range for hard white shavings. At mid-1983, the value of mixed had dropped, while the shavings were up 150%, because of their ability to replace some costly virgin pulps.

This disparity can only widen in the future, for two major reasons. One is the inevitable increase in processing costs. The second is the rising production of good-quality, end-use, high-volume white papers generated in the rapidly expanding data-processing area.

## "Minority" Boards Expand in '82

### Paperboard Mill Review

Table D-1: Production of U.S.

D-1 — Paperboard Mill Production by Grades (tons)

| Grades                    | 1952              | 1962              | 1972              | 1980              | 1981              | 1982              |
|---------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Other (Jute) Liner        | 772,700           | 701,800           | 278,900           | 444,500           | 324,200           | 279,000           |
| Kraft Liner               | 2,910,100         | 5,514,700         | 10,577,600        | 11,948,600        | 12,754,300        | 11,656,500        |
| .009 Semichemical         | 1,057,200         | 2,188,800         | 3,874,200         | 4,398,500         | 4,561,200         | 4,202,500         |
| Recycled Medium           | 588,600           | 633,300           | 972,300           | 1,047,199         | 1,140,900         | 1,139,500         |
| Chip & Filler             | 329,000           | 260,400           | 315,900           | 231,500           | 259,500           | 230,200           |
| <b>Total Containerb'd</b> | <b>5,637,000</b>  | <b>9,299,000</b>  | <b>16,018,900</b> | <b>18,070,200</b> | <b>19,040,100</b> | <b>17,507,500</b> |
| Folding boxboard          | 2,341,800         | 3,120,600         | 4,396,300         | 4,494,600         | 4,587,600         | 4,333,700         |
| Set-up Boxboard           | 635,300           | 523,800           | 455,100           | 241,500           | 236,000           | 223,600           |
| Milk/Food Board           | 834,600           | 1,620,800         | 1,699,600         | 1,421,700         | 1,392,500         | 1,283,700         |
| <b>Total Boxboard</b>     | <b>3,811,900</b>  | <b>5,265,200</b>  | <b>6,551,000</b>  | <b>6,157,800</b>  | <b>6,216,100</b>  | <b>5,841,000</b>  |
| Other                     | 1,755,400         | 3,283,200         | 5,932,500         | 5,724,200         | 5,076,100         | 5,716,800         |
| <b>Grand Total</b>        | <b>11,045,500</b> | <b>17,847,400</b> | <b>28,502,500</b> | <b>30,952,300</b> | <b>31,232,200</b> | <b>29,065,300</b> |

Source: American Paper Institute

## Statistics *continued*

packaging paperboard in 1982 was down 6.9% from the previous year, compared with an annual average rise of 2% since 1972, and of 6% in the 1962-72 years. The grades listed are those tabulated by the American Paper Institute, and exclude non-packaging boards listed by the Census Bureau, as noted earlier.

A continuing trend is the expansion in "minority" board types, such as the recycled medium and chip/filler grades, which had been in eclipse for many years, giving way under the advance of premium-grade kraft. Thus, the 1982 tonnage of recycled corrugating medium is up 17% in the decade, precisely double the 8.5% advance for semichemical.

This reflects the greatly improved technologies in reprocessing of the secondary fibres, so as to retain their qualities of strength. The proportions in reclaimed fibres now permissible in linerboard and other high-quality grades would have produced only second-rate boards until very recent years. Now, the tonnage of recycled fibre entering into primary products is far higher than it ever was in the days of the

crude, non-test "jute" materials.

Unfortunately, the tonnage of packaging boxboards is actually 10% lower than it was 10 years ago—the decline being in milk/food service and setup boards. This reflects the extent to which many paperboard applications have been taken over by "convenience" materials such as film bags, plastic beverage containers, foamed-plastic boxes, and the like.

At the same time, it is seen that much of this lost tonnage is unidentified as packaging material, but has reappeared in the "other" category, which now very nearly approaches the total volume of boxboard.

This "other" material is entering specialty applications such as the shrink- and stretch-packs, composite cans, and other variations on the "square box" theme, but in which the board consumed is not tabulated by any industry agency. Thus, the board is not actually lost to packaging, but is simply not being identified with the basic package types.

**Table D-2:** The worldwide economic recession of recent years has brought about a decline in U.S. paperboard exports—down 26% in 1982 from the all-time high of 1980. The total last year, however, was

up by 280% from 20 years ago, and 1300% from '52.

This depicts the rising overseas demand for our raw materials, many of which can be bought abroad for less than cost of production there.

The foreign demand is seen to vary greatly by grade. Thus, 11% of 1982's containerboard production (see Table D-1) was shipped away, compared with 5% of the boxboard tonnage. In fact, the popularity of U.S. containerboards with overseas converters may pose a significant effect on available domestic supply.

It will be seen that 1982 produced 8.2 million more tons of containerboard than did 1962, but 18% of that additional tonnage was exported. Over those 20 years, the gain in tonnage available to U.S. converters was 88%, but the consumption of fibre boxes went up 105%.

With this slow attrition on domestic supply, and with very little new capacity construction scheduled, the predictions of paperboard shortages in some grades, following return to economic recovery, may prove to be well founded.

**Table D-3:** The grades listed are

**D-2 — Paperboard Exports (tons)**

| Grades           | 1952           | 1962           | 1972             | 1978             | 1980             | 1981             | 1982             |
|------------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|
| Containerboard   | 92,851         | 489,380        | 2,158,200        | 2,304,300        | 2,693,600        | 2,105,100        | 1,959,200        |
| Boxboard         | 23,129         | 87,849         | 140,700          | 304,200          | 399,500          | 322,600          | 300,200          |
| Building Board   | 24,737         | 21,910         | 69,700           | 53,000           | 56,600           | 47,100           | 43,800           |
| Card Board       | 8,549          | 8,944          | 30,600           | 81,100           | 93,200           | 89,200           | 83,100           |
| Other Paperboard | 24,378         | 43,811         | 82,600           | 166,000          | 86,500           | 83,300           | 77,500           |
| <b>Total</b>     | <b>173,844</b> | <b>651,894</b> | <b>2,481,800</b> | <b>2,910,600</b> | <b>3,329,400</b> | <b>2,647,300</b> | <b>2,463,700</b> |

Source: U.S. Dept. of Commerce BDSA.

**D-3 — Folding & Set-up Boxboard Production (tons)**

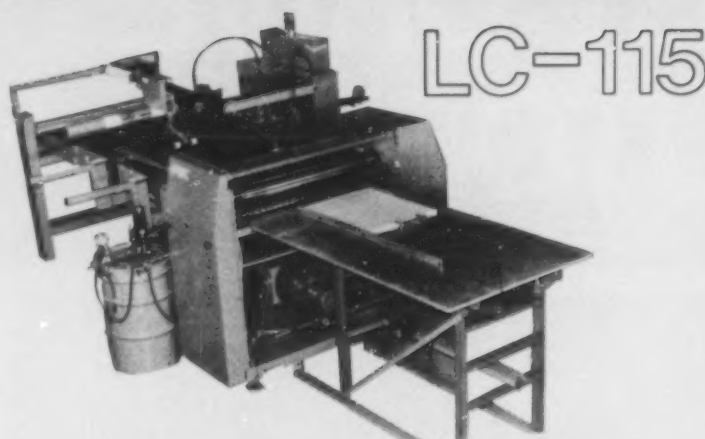
| Grades                      | 1952             | 1962             | 1972             | 1978             | 1980             | 1981             | 1982             |
|-----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Unlined Chipboard           | 423,500          | 505,100          | 92,400           | 46,700           | 44,900           | 45,800           | 91,100           |
| Lined Chip                  | 429,900          | 831,000          | 1,059,500        | 1,164,700        | 1,105,7700       | 1,055,100        | 1,044,400        |
| Patent Coated               | 494,500          | 550,500          | 646,200          | 713,100          | 683,200          | 683,500          | 637,000          |
| Clay or Other Coated        | 214,800          | 767,000          | 1,776,100        | 1,983,800        | 1,996,400        | 2,050,600        | 1,750,800        |
| Other Folding               | 488,400          | 466,400          | 822,100          | 636,800          | 664,400          | 752,600          | 850,400          |
| <b>Total Folding</b>        | <b>2,551,100</b> | <b>3,120,600</b> | <b>4,396,300</b> | <b>4,706,600</b> | <b>4,494,600</b> | <b>4,587,600</b> | <b>4,333,700</b> |
| Newsprint Chip & Solid News | 605,100          | 385,100          | 402,950          | 310,700          | 225,600          | 220,500          | 208,900          |
| Other Lined & Unlined Chip  | 52,100           | 191,300          | 121,320          | 82,300           | 59,700           | 55,400           | 55,300           |
| Other Set-up                | - 21,900         | - 52,600         | - 89,170         | - 60,300         | - 43,800         | - 42,900         | - 40,600         |
| <b>Total Set-up</b>         | <b>635,300</b>   | <b>523,800</b>   | <b>485,100</b>   | <b>332,700</b>   | <b>241,500</b>   | <b>236,000</b>   | <b>223,600</b>   |

Source: Grades are Bureau of Census. Totals of folding and set-up are American Paper Institute. Other folding and other set-up are balancing figures.



LC-115 LABEL LAMINATOR

## LOW COST LAMINATOR



**Crathern & Smith**, formerly FMC Corrugated Laminating Equipment, now offers a label laminating system with the speed and size range of our fully automatic system at half the price.

The LC-115 is a manually fed laminating system. Your operators and mechanics will quickly become proficient with this machine because of its design simplicity.

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Electronic controls assure accurate registration of labels to substrate at speeds to 20 pieces per minute.

The LC-115 is your opportunity to get into label laminating, expand your present capacity, or add peak load capacity at a very affordable price.

### CHECK THESE FEATURES

- |                                                                         |                                                               |
|-------------------------------------------------------------------------|---------------------------------------------------------------|
| ✓ Speed to 20 laminations per minute.                                   | ✓ Low operator skill level requirements.                      |
| ✓ Standard 45" X 66" size capacity.                                     | ✓ Minimal 18½' X 9½' floor space.                             |
| ✓ Registration concept proven in hundreds of applications.              | ✓ Full size changeover in about 15 minutes.                   |
| ✓ Full or spot labeling capability.                                     | ✓ Simple to maintain.                                         |
| ✓ 55-gallon recirculating system uses dextrine or resin base adhesives. | ✓ Laminates to flat board, die cuts, or pre-glued containers. |

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**C&S**

## Statistics *continued*

as recognized by the U.S. Bureau of Census, adjusted to American Paper Institute total by the "other" figures.

Set-up boxboards in 1982 continued their decline as a major element in the paperboard packaging field, down 665% in tonnage from 30 years ago, and now representing less than 5% of the combined folding/set-up total, compared with 20% in 1952. To some extent, this drop in tonnage is due to development of the lighter, stronger boards, and thus is not a direct reading of footage.

The trend continues toward use of lighter-colored, smoother, more machinable boards. For example, the "clay- and other-coated" tonnage in 1982 was 40% of the folding total, compared with 25% in 1962.

**Table D-4:** The 1982 mill activity ratio—simple proportion of actual production to projected capacity—was at its second-lowest level in the industry's history, higher only than the semi-paralysis of 1975.

However, mid-year 1983 finds production up nearly 6% from '82—and containerboard output up 7%—with no corresponding increase in scheduled capacity. A similar encroachment on available capacity occurred in vigorous 1973, with some regrettable results in the postponed maintenance of major machinery.

However, at that time the nation at least had a fairly substantial influx of new capacity about to go on-stream. That is not the case now, and in absence of another economic downturn the future may hold sharp shortages in some board grades.

**Table D-5:** On the basis of existing construction commitments, U.S. capacity for the packaging paperboards (omitting wallboard facing and the "other") will expand by 0.3% between 1982 and '84, comprising a minuscule drop for containerboard grades and a 1.5% increase for boxboards. This is far below a typical average, and is only one of the evidences of plans for revision in recent years.

Many of these seeming contradictions and inconclusives arise from the constant intrusion of wholly new problems into the

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## Statistics *continued*

economy, so that the best-laid plans of today may become precarious tomorrow.

With basic costs of construction more than tripled in a half-dozen years, with outstripping improvement in product price, and with vast advances in operating expense, many growth plans are being deferred, and their retrievals are cautious.

## Corrugated Consumption Slows in '82

### Corrugated/Solid Fiber Review

**Table E-1:** Box plant production of corrugated plus solid fibre in 1982 (without deduction for scrap conversion) was down 2.6% from '81 and by 8.7% from all-time high '79, though up by 11.7% from 1972, by 95% from '62, and by 221% from '52.

It will be seen that the average-year increase in consumption of these materials is slowing, as they have taken over a near-complete share of the market for long-distance shipment packagings.

Thus, the average annual expansion of tonnage between 1952 and '62 was 6.5%, which became 7.4% between '62 and '72 as the shift quickened to corrugated from alternate materials. But between '72 and '82 the average has subsided to less than 1% per year, as

**D-4 — Board Mill Capacity & Utilization (tons)**

| Year | Capacity—<br>American<br>Paper Inst. | Utilized<br>(Production) | Activity<br>Rate | Unused—<br>Excess<br>Capacity |
|------|--------------------------------------|--------------------------|------------------|-------------------------------|
| 1952 | 12,999,400                           | 11,049,500               | 86%              | 1,949,900                     |
| 1962 | 19,399,300                           | 17,847,400               | 92               | 1,551,900                     |
| 1972 | 29,324,000                           | 26,502,500               | 97               | 939,700                       |
| 1975 | 32,951,000                           | 24,717,300               | 75               | 8,237,700                     |
| 1976 | 32,338,000                           | 26,439,100               | 88               | 3,899,000                     |
| 1977 | 32,568,000                           | 28,953,100               | 89               | 3,974,900                     |
| 1978 | 33,332,000                           | 30,274,900               | 91               | 3,024,200                     |
| 1979 | 33,559,000                           | 31,428,900               | 93               | 2,130,100                     |
| 1980 | 33,788,000                           | 30,952,300               | 92               | 2,835,700                     |
| 1981 | 34,245,000                           | 31,232,200               | 91               | 3,012,800                     |
| 1982 | 35,501,600                           | 29,065,300               | 82               | 6,435,700                     |

Source: American Paper Institute. Capacity is obtained by dividing production by activity rate (X100).

**D-5 — Future Board Capacity, Existing Commitments**

(313-day basis, at year end, M tons)

|                              | 1981          | 1982          | 1983          | 1984          |
|------------------------------|---------------|---------------|---------------|---------------|
| Kraft Linerboard             | 15,391        | 16,086        | 16,307        | 16,157        |
| Comb. Linerboard (Jute)      | 404           | 547           | 560           | 614           |
| Semichemical Medium          | 5,009         | 5,180         | 5,477         | 5,479         |
| Other Medium                 | 1,526         | 1,385         | 1,415         | 1,479         |
| Container Chip               | 320           | 286           | 287           | 295           |
| <b>Total Containerboards</b> | <b>22,650</b> | <b>23,483</b> | <b>24,046</b> | <b>24,024</b> |
| Bending Board                | 5,707         | 5,366         | 5,410         | 5,484         |
| Non-Bending Board            | 427           | 352           | 362           | 333           |
| Bleached Linerboard          | 138           | 108           | 108           | 103           |
| Other Bleached Packaging     | 1,918         | 1,794         | 1,786         | 1,872         |
| Other Bleached               | 206           | 228           | 230           | 223           |
| <b>Total Boxboards</b>       | <b>8,396</b>  | <b>7,848</b>  | <b>7,896</b>  | <b>8,015</b>  |
| Wallboard Facing             | 1,301         | 1,269         | 1,285         | 1,292         |
| All Other Board              | 3,092         | 2,281         | 2,304         | 2,302         |
|                              | 4,393         | 3,550         | 3,589         | 3,594         |
| <b>Total Paperboard</b>      | <b>35,439</b> | <b>34,881</b> | <b>35,531</b> | <b>36,175</b> |

Source: American Paper Institute, Inc.

corrugated saturates the market.

The same is shown in cyclic patterns of advance and retreat over the past decade. There were five years up in tonnage, and five down, with the average annual footage advance stuck at precisely the

period's midpoint.

This depicts a basically mature industry, responsive to temporary peaks and valleys of economy, but unlikely to develop either a major unexpected expansion or a

(continued on page 58)

**E-1 — Annual Fibre Box Plant Production (tons & M sq ft)**

| Year | Corrugated |             | Solid Fibre |           | Total      |             |
|------|------------|-------------|-------------|-----------|------------|-------------|
|      | Tons       | M Sq Ft     | Tons        | M Sq Ft   | Tons       | M Sq Ft     |
| 1952 | 5,303,300  | 74,595,400  | 368,700     | 2,345,100 | 5,672,000  | 76,940,500  |
| 1962 | 8,625,500  | 125,741,700 | 194,900     | 1,247,600 | 8,820,400  | 126,989,300 |
| 1972 | 15,030,800 | 220,109,600 | 158,600     | 1,116,300 | 15,189,400 | 221,225,900 |
| 1973 | 16,284,500 | 236,918,900 | 161,900     | 1,139,300 | 16,446,400 | 238,058,200 |
| 1974 | 15,284,300 | 224,534,200 | 144,500     | 1,016,700 | 15,428,800 | 225,550,900 |
| 1975 | 13,860,800 | 203,230,200 | 114,600     | 806,600   | 13,975,400 | 204,036,800 |
| 1976 | 15,667,100 | 227,817,700 | 122,200     | 859,800   | 15,667,100 | 228,677,500 |
| 1977 | 16,337,200 | 238,800,900 | 126,900     | 893,100   | 16,464,100 | 239,694,000 |
| 1978 | 17,541,250 | 256,400,900 | 131,100     | 922,400   | 17,708,700 | 257,323,300 |
| 1979 | 18,159,700 | 261,072,000 | 137,400     | 966,600   | 18,159,700 | 270,738,000 |
| 1980 | 17,489,500 | 251,939,000 | 129,400     | 910,200   | 17,618,900 | 252,849,200 |
| 1981 | 17,821,200 | 253,032,000 | 119,800     | 842,500   | 17,941,000 | 253,874,500 |
| 1982 | 17,717,900 | 246,298,000 | 128,300     | 902,000   | 17,846,200 | 247,191,000 |

Source: Fibre Box Assn. Production is at end of combiner, without deduction of box shop waste. Tons represent board consumed.

## Statistics *continued*

shrinkage in use.

Another evidence of "maturity" seen here is the leveling off of corrugated weight per unit area, as kraft liners and semichemical medium almost entirely replace the diversity of old, heavier containerboards. Thus, in 1952 one ton of board yielded 14,066 sq ft of corrugated; in 1962 it had become 14,578 sq ft and in '72 was 14,644 sq ft. This dropped to 14,100 in 1982, reflecting the greatly increased production of double- and triplewall corrugated, over the decade.

**Table E-2:** A 4.5% drop from '81 brought the 1982 shipped footage of corrugated and solid fibre products to the lowest total in five years, 6.2% below the all-time high of '79, and only 3% above 1973. Of this total, 99.6% was corrugated.

Total shipped value was history's second highest, down 6.7% from the previous year but up 136% from 1972, by 367% from '62, and 690% from '52. Average square-foot volume was also a second-best for both fibre types.

It may be seen that the 11% increase in corrugated shipments since 1972 is about one-twelfth of the increase in unit value. This promises an industry income advance well below the rate of inflation in other basic commodities over those years.

On the other hand, the value advance did respond to the ramifications of escalating energy cost that began in 1973, with the sudden explosion of world petroleum prices.

Thus, of the 23.4 billion sq ft increase in shipments between 1972 and '82, an expectable 50% appeared in the first five of these years. But of the \$21 value increase

per MSF between '72 and '82, some 62% appeared in those years, which followed the first "crunch" in oil prices.

The footage of solid-fibre materials, though now only 0.4% of total shipments—about one-quarter of the proportion in 1962—continues to maintain a stable and even upward volume in recent years. This suggests that there remain some applications in which solid-fibre products are not adequately replaced by alternate materials. It also substantiates the expanding popularity of reusable solid-fibre slip-sheets for separating stacks of various converted products shipped on skids, but not baled.

**Table E-3:** The acceptance of fibre containers in the national economy may be calculated clearly from the comparable increase in U.S. population, along with our per-capita box consumption.

**E-2 — Corrugated & Solid Fibre Shipments (M sq ft & value)**

| Year | Total M Sq Ft |             |             | Total Value     |              |                 | Average Value per M Sq Ft |             |         |
|------|---------------|-------------|-------------|-----------------|--------------|-----------------|---------------------------|-------------|---------|
|      | Corrugated    | Solid Fibre | Total       | Corrugated      | Solid Fibre  | Total           | Corrugated                | Solid Fibre | Total   |
| 1952 | 72,328,20     | 2,273,600   | 74,601,800  | \$1,111,010,600 | \$70,841,300 | \$1,181,851,900 | \$15.36                   | \$31.16     | \$15.84 |
| 1962 | 120,994,000   | 1,187,200   | 122,181,200 | 1,956,573,300   | 43,842,200   | 2,000,415,000   | 16.17                     | 36.93       | 16.37   |
| 1972 | 210,879,800   | 1,046,300   | 211,926,100 | 3,919,882,900   | 40,061,600   | 3,959,924,500   | 18.59                     | 38.29       | 18.69   |
| 1973 | 226,984,300   | 1,067,900   | 228,052,200 | 4,815,486,600   | 46,569,700   | 4,862,056,300   | 21.22                     | 43.61       | 21.32   |
| 1974 | 215,119,000   | 953,000     | 216,072,000 | 5,742,301,300   | 50,683,500   | 5,792,984,900   | 26.69                     | 53.18       | 26.81   |
| 1975 | 193,573,100   | 756,100     | 194,329,200 | 5,578,612,500   | 45,152,700   | 5,623,765,200   | 28.82                     | 59.72       | 28.94   |
| 1976 | 215,564,600   | 806,600     | 216,371,200 | 6,395,870,800   | 8,067,500    | 6,443,938,300   | 29.67                     | 59.64       | 29.78   |
| 1977 | 226,359,700   | 837,800     | 227,197,500 | 6,691,170,000   | 50,574,100   | 6,741,744,100   | 29.56                     | 60.37       | 29.67   |
| 1978 | 242,998,100   | 898,900     | 243,897,000 | 7,204,311,000   | 55,786,300   | 7,260,097,300   | 29.65                     | 62.06       | 29.77   |
| 1979 | 249,701,000   | 942,000     | 250,643,000 | 8,344,624,600   | 63,269,400   | 8,407,984,000   | 33.42                     | 67.16       | 33.55   |
| 1980 | 240,490,000   | 888,000     | 241,378,000 | 9,010,411,800   | 6,970,200    | 9,075,381,800   | 37.47                     | 74.08       | 27.60   |
| 1981 | 245,331,000   | 821,000     | 246,152,000 | 9,956,771,000   | 62,750,200   | 10,019,521,200  | 40.59                     | 76.43       | 40.70   |
| 1982 | 234,306,000   | 879,000     | 235,185,000 | 9,278,984,700   | 64,630,200   | 9,343,619,900   | 39.60                     | 73.53       | 39.73   |

**E-3 — Per Capita Shipments, Corrugated & Solid Fibre**

| Year | Per Capita Consumption — Sq Ft |            |             |        |
|------|--------------------------------|------------|-------------|--------|
|      | Midyear U.S. Population        | Corrugated | Solid Fibre | Total  |
| 1942 | 134,656,078                    | 288.0      | 27.2        | 315.2  |
| 1952 | 157,028,000                    | 460.6      | 14.5        | 475.1  |
| 1962 | 185,951,000                    | 648.5      | 6.4         | 654.8  |
| 1972 | 208,842,000                    | 1009.8     | 5.0         | 1014.8 |
| 1974 | 211,909,000                    | 1015.1     | 4.5         | 1019.6 |
| 1975 | 213,641,000                    | 906.1      | 3.5         | 909.6  |
| 1976 | 214,659,000                    | 1004.2     | 3.8         | 1008.0 |
| 1977 | 216,383,000                    | 1046.1     | 3.9         | 1050.0 |
| 1978 | 218,228,000                    | 1111.4     | 4.1         | 1115.5 |
| 1979 | 220,099,000                    | 1134.5     | 4.3         | 1138.8 |
| 1980 | 223,174,000                    | 1077.6     | 4.0         | 1081.6 |
| 1981 | 226,292,000                    | 1084.1     | 3.6         | 1087.7 |
| 1982 | 230,547,000                    | 1066.3     | 3.9         | 1072.2 |

Source: Based on Fibre Box Assn. and Bureau of Census data.

**E-4 — Grades of Corrugated Board Production (M sq ft)**

| Year | Single Face | Double Face | Double and Triple Wall | Total       |
|------|-------------|-------------|------------------------|-------------|
| 1952 | 1,566,500   | 69,224,500  | 3,804,500              | 74,595,400  |
| 1962 | 1,415,500   | 116,832,800 | 7,493,400              | 125,741,700 |
| 1972 | 1,566,500   | 200,902,100 | 17,640,900             | 220,109,500 |
| 1973 | 1,490,000   | 216,841,400 | 20,195,800             | 238,527,200 |
| 1974 | 1,492,200   | 203,448,600 | 19,153,800             | 224,094,600 |
| 1975 | 1,165,500   | 186,172,400 | 15,892,300             | 203,230,200 |
| 1976 | 1,305,200   | 207,879,800 | 18,632,700             | 227,817,700 |
| 1977 | 1,216,500   | 217,183,800 | 20,400,600             | 238,800,900 |
| 1978 | 1,265,000   | 232,827,000 | 22,309,000             | 256,401,000 |
| 1979 | 1,166,000   | 236,670,000 | 23,236,000             | 261,072,000 |
| 1980 | 1,144,000   | 229,054,000 | 21,741,000             | 251,939,000 |
| 1981 | 1,126,000   | 229,808,000 | 22,098,000             | 253,032,000 |
| 1982 | 1,118,000   | 224,180,000 | 20,921,000             | 246,289,000 |

Source: Fibre Box Assn.



# E-6 — Fibre Box Plants, Equipment, Investment, Employees

|                                  | 1952       | 1962       | 1972         | 1976         | 1977         | 1978         | 1979         | 1980         | 1981         | 1982         | 1983         |
|----------------------------------|------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Converting Plants                | 338        | 434        | 614          | 654          | 671          | 690          | 676          | 669          | 666          | 652          | 644          |
| Sheet Plants                     | 254        | 422        | 710          | 775          | 815          | 857          | 854          | 848          | 842          | 814          | 771          |
| <b>Total Plants</b>              | <b>592</b> | <b>856</b> | <b>1,324</b> | <b>1,429</b> | <b>1,516</b> | <b>1,537</b> | <b>1,530</b> | <b>1,517</b> | <b>1,508</b> | <b>1,466</b> | <b>1,415</b> |
| Dbl.-Face Corrugators Operated   | 402        | 515        | 662          | 744          | 755          | 768          | 760          | 754          | 754          | 747          | 739          |
| Dbl.-Face Corrugators Total Trim | 29,582"    | 39,622"    | 52,960"      | 60,781"      | 61,774"      | 62,811"      | 62,424"      | 62,209"      | 62,175"      | 61,020"      | 60,938"      |
| Pasters Operated                 | 52         | 39         | 33           | 37           | 36           | 36           | 36           | 34           | 33           | 32           | 30           |
| Pasters Total Trim               | 4,494"     | 3,197"     | 2,736"       | 3,055"       | 3,005"       | 3,005"       | 3,0005"      | 2,857"       | 2,737"       | 2,654"       | 2,488"       |
| <b>Total Companies</b>           | <b>431</b> | <b>477</b> | <b>732</b>   | <b>819</b>   | <b>875</b>   | <b>894</b>   | <b>884</b>   | <b>879</b>   | <b>877</b>   | <b>853</b>   | <b>819</b>   |
| Est. Investment (MM\$)           | \$ 273.0   | \$ 541.0   | \$1,055.9    | \$1,192.6    | \$1,272.5    | \$1,334.9    | \$1,426.1    | \$1,588.7    | \$1,646.5    | \$1,515.9    | \$1,503.6    |
| No. Employees                    | 40,200     | 55,900     | 98,440       | 111,370      | 117,860      | 119,810      | 119,120      | 118,110      | 114,200      | 112,100      | 98,400       |

Source: Plant and machine data from **Official Container Directory**; investment estimated; employment from Fibre Box Assn. A converter must operate complete corrugators or pasters to be so classed; one operating only single facers is classed as a sheet plant (one who buys combined board from converters). Companies represent entities, ignoring influence of subsidiaries, affiliates or parent relationships, non-operating parent companies not counted.

In the 1972-82 decade, population went up 10.4% and individual box demand 20%. Since 1962—23% more people, and 65% more boxes for each. Since '52—47% more people, 132% more boxes. Since 1942—71% more people, 271% more boxes for each. In short, since World War II, the per capita use of shipping containers has gone up nearly four times as fast as the number of "capitas" using them.

That, in turn, reflects the vastly improved standards of daily living made possible by the protection provided in long-distance shipping of exotic consumer products.

As a result, the average citizen in 1982 spend \$40.53 for his share of fibre containers. The individual expenditure was \$18.96 in 1972—\$10.70 in '62, and \$8.78 in '52.

With all allowance for inflation, improved marketing, and better distribution techniques, it seems unlikely that many basic commodities have achieved a more-than-doubling of personal expenditure over the past 10 years, and a tripling over the last 20.

A fortunate effect of this for the box industry is that it offsets the decline in birth rate of new customers. Between 1942 and '52, for example, the average annual increase in U.S. population was 1.7%—nearly double the rate in 1972-82. But over those same decades, the annual individual box use rate has more than doubled.

**Table E-4:** The protective value of corrugated containers, even for the heaviest-duty applications, is seen in the recent-years expansion of double- and triplewall board, compared with conventional double-face. Thus, though the latter's volume still made up 91% of the 1982 total footage, and was up 16%

# E-5 — Corrugated & Solid Fibreboard Consumption (tons)

| Year | Kraft & Jute Liners | .009 Corrugated Materials | Liner & Filler Chip | Total      |
|------|---------------------|---------------------------|---------------------|------------|
| 1952 | 3,767,300           | 1,659,300                 | 295,400             | 5,722,000  |
| 1962 | 5,912,200           | 2,716,500                 | 191,700             | 8,820,400  |
| 1972 | 10,334,600          | 4,697,700                 | 157,100             | 15,189,400 |
| 1974 | 10,621,200          | 4,746,200                 | 61,400              | 15,428,800 |
| 1975 | 9,609,100           | 4,320,200                 | 46,100              | 13,975,400 |
| 1976 | 10,782,000          | 4,844,400                 | 50,700              | 15,677,100 |
| 1977 | 11,318,300          | 5,102,500                 | 43,300              | 16,464,100 |
| 1978 | 12,168,400          | 5,949,700                 | 45,600              | 17,708,700 |
| 1979 | 12,456,000          | 5,654,500                 | 9,200               | 18,159,700 |
| 1980 | 12,016,500          | 5,427,400                 | 43,600              | 17,487,500 |
| 1981 | 12,262,400          | 5,530,400                 | 28,400              | 17,821,200 |
| 1982 | 11,751,300          | 5,337,400                 | 29,200              | 17,117,900 |

Source: Fibre Box Assn.

from 1972 and 92% from '62, production of the heavy-duty materials rose 43% from '72 and 180% from '62.

From another standpoint: Although double- and triplewall corrugated made up only 8.5% of the 1982 footage, and 6% in 1962, their proportion of the additional footage since '62 has been 11% of total new volume.

Production of single-face corrugated also has been remarkably stable for two decades, considering the great variety of newer cushioning products, such as foamed plastic modules. The footage of single-face in 1982 remained at more than 70% of its volume of 30 years ago. It appears that there are some applications for which the particular features of this material are not replaced satisfactorily by alternate cushionings, while at the same time it has little or no appeal for use in new applications.

**Table E-5:** Clearly evident here is the recent years' replacement of non-kraft containerboards by new primary materials. In 1952 (not shown) nearly 50% of all boards

entering into U.S. corrugated/solid fibre products comprised the jute, cylinder, straw, chip, and similar grades. By 1962 this had been reduced to a mere 3%, and by '82 to a minuscule 0.2% of total tonnage.

With this virtual disappearance of the heavier boards, the footage produced in 1982 was 230% greater than in 1952 and 69% up from '62, while the tonnage of board consumed was only 199% higher, respectively.

However, it may well be that a reversal is about to appear in the decline of these ancient secondary grades. The ability of existing primary board mills to meet corrugated demand in a normal economy—which we must assume is coming—will be very nearly 100% of their capacity. The modernization of in-place equipment has been completed to a practical maximum.

Yet little new containerboard capacity is under construction, because of exorbitant costs. It is realistic to project that primary tonnage will be fully absorbed in the foreseeable future, and that the available non-kraft capacity will have to be revived.



## Statistics *continued*

**Table E-6:** For the fifth consecutive year, reductions appeared in the number of operating corrugated combiner plants, sheet plants, and total companies, according to listings in our *Official Container Directories*.

Between mid-1982 and mid-'83, eight U.S. converting plants and 43 sheet plants were closed, and 34 companies left the lists. The disparity between 51 plant closings and 34 company closings suggests that the economic attrition has been significantly more marked for independent operations than for integrated facilities.

Continuing also, however, is the rise in productivity of the average plant. In 1962, the 434 combiner plants recorded produced an average of 289 million sq ft of corrugated board. The average reached 358 million in 1972, and 382 million last year. Thus, the average converting plant production was up 17% in the decade, and 32% from the level of 20 years ago.

## Lighter Materials Replace Heavy Boards

### Folding Carton Review

**Table F-1:** The tonnage of boxboards entering into folding carton conversion in 1982 was down 1.7% from the previous year, and 5.1% below the all-time high of 1979. In fact, the '82 tonnage was up only 3% from 10 years ago, and less than 13% from 20 years ago.

**F-1 — Folding Boxboard Consumed (tons)**

| 1967 — 100 |           |       |
|------------|-----------|-------|
| Year       | Tons      | Index |
| 1962       | 2,407,300 | 77.7  |
| 1962       | 2,859,000 | 130.3 |
| 1972       | 3,117,000 | 100.6 |
| 1973       | 3,227,000 | 104.2 |
| 1974       | 3,180,000 | 102.0 |
| 1975       | 2,938,000 | 94.8  |
| 1976       | 3,200,000 | 103.3 |
| 1977       | 3,258,000 | 105.2 |
| 1978       | 3,375,000 | 108.9 |
| 1979       | 3,393,000 | 109.5 |
| 1980       | 3,311,000 | 106.9 |
| 1981       | 3,274,000 | 105.7 |
| 1982       | 3,219,000 | 103.9 |

Source: Paperboard Packaging Council

These direct comparisons may be a bit misleading, since a portion of the old heavy boards has been replaced, in recent years, by lighter materials that offer greater area per ton. A rough estimate of this replacement might be made from Table F-3.

In any case, the recent-years' decline of expansion rate for the folding cartons shows clearly the success of other materials, such as plastics, and of other treatments, such as "shrink" packs, in replacing small paperboard boxes.

For another comparison—in the 10 years ended 1982, the tonnage of corrugated containers went up 18%, compared with the 1.3% for folding cartons. And, in the two decades beginning 1962, corrugated board consumption tonnage rose 105%—more than eight times the percentage increase for cartons.

An even more striking comparison is in relative per-capita consumption of the folding cartons and the corrugated containers. Twenty years ago, the average U.S. citizen

**F-2 — Folding Carton Shipment Value**

| Year | Dollars (1000) | Tons      | Average Value/Ton |
|------|----------------|-----------|-------------------|
| 1962 | \$700,743      | 2,190,800 | \$319.89          |
| 1962 | 952,200        | 2,315,900 | 411.15            |
| 1972 | 1,330,000      | 2,525,000 | 526.73            |
| 1973 | 1,480,000      | 2,614,000 | 558.53            |
| 1974 | 1,664,980      | 2,531,721 | 659.50            |
| 1975 | 1,755,000      | 2,380,000 | 737.39            |
| 1976 | 1,979,000      | 2,592,000 | 763.50            |
| 1977 | 2,100,000      | 2,639,000 | 797.65            |
| 1978 | 2,278,000      | 2,734,000 | 833.21            |
| 1979 | 2,435,000      | 2,748,000 | 886.10            |
| 1980 | 2,620,000      | 2,662,000 | 976.88            |
| 1981 | 2,866,000      | 2,652,000 | 1,080.69          |
| 1982 | 2,962,000      | 2,607,000 | 1,132.54          |

Source: Paperboard Packaging Council

had a 90.6 lb share of the 1962 corrugated shipments, and 24.8 lb of folding cartons. In 1982 his share of corrugated was 147.3 lbs, up 62% in the two decades, while his cartons share had dropped to 22.6 lbs—down 9% during a 23% increase in population.

**Table F-2:** Again, one of the packaging field's most firmly fixed statistics was repeated in 1982: The proportion of scrap from conversion was precisely 19%, as it has been for decades. This brought the year's carton shipment tonnage to 1.7% down from 1981, and 5% below the all-time high volume set in 1979. It also was a bit below the decade's average.

Shipments value, now nearing \$3 billion annually, was 3% above 1981. This is notably less than the overall price inflation, and compares with an average yearly value increase of 12% since 1972 and 10.5% since '62.

The total dollar-value advance of expanding shipments is clearly

**F-3 — Grades' Share of Folding Boxboard Production (M Tons and % of Total)**

| Grades                 | 1960         |              | 1970         |              | 1978         |              | 1979         |              | 1980         |              | 1981         |              | 1982         |              |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Solid Bleached Sulfate | 728          | 25.5%        | 1,144        | 37.2%        | 1,283        | 37.4%        | 1,264        | 36.9%        | 1,236        | 37.4%        | 1,180        | 36.1%        | 1,128        | 35.6%        |
| Clay-Coated Kraft      | 734          | 25.7         | 1,033        | 33.6         | 1,181        | 35.0         | 1,181        | 34.8         | 1,179        | 35.6         | 1,271        | 38.8         | 380          | 11.8         |
| Bending Chip           | 226          | 7.9          | 296          | 9.6          | 405          | 12.0         | 433          | 12.8         | 432          | 13.0         | 390          | 11.9         | 149          | 4.6          |
| Laminated              | 326          | 11.4         | 231          | 7.5          | 198          | 5.9          | 173          | 5.1          | 156          | 4.7          | 164          | 5.0          | 115          | 3.6          |
| Bleached               | 206          | 7.2          | 120          | 3.9          | 110          | 3.3          | 126          | 3.7          | 116          | 3.5          | 108          | 3.2          | 86           | 2.1          |
| Manila                 | 208          | 7.3          | 114          | 3.7          | 90           | 2.7          | 74           | 2.2          | 71           | 2.1          | 60           | 1.8          | 43           | 1.3          |
| Patent Coated          | 391          | 13.7         | 105          | 3.4          | 85           | 2.5          | 104          | 3.1          | 87           | 2.0          | 53           | 1.6          | 50           | 1.6          |
| All Other              | 28           | 1.3          | 33           | 1.1          | 42           | 1.2          | 48           | 1.4          | 55           | 1.7          | 53           | 1.6          | 53           | 100.0        |
| <b>Total</b>           | <b>2,888</b> | <b>100.0</b> | <b>3,075</b> | <b>100.0</b> | <b>3,375</b> | <b>100.0</b> | <b>3,363</b> | <b>100.0</b> | <b>3,311</b> | <b>100.0</b> | <b>3,274</b> | <b>100.0</b> | <b>3,219</b> | <b>100.0</b> |

Source: Paperboard Packaging Council

## Statistics *continued*

due more to increasing unit-value than to greater tonnage. Thus, shipped volume in 1982 went down 1.7% from '81, up 3.2% from '72, and up 12.5% from '62, while average-ton price rose respectively 3%, 122%, and 210% over those periods.

In fact, some measure of the pervasive inflation in recent years may be seen in that dollar value rise of average-ton carton shipments between 1972 and '82 was more

than five times greater than that between '62 and '72.

**Table F-3:** The expansion in consumption of high-grade boxboards illustrates the response of designers to successful inroads by competitive materials in applications long held by folding cartons. And that, in turn, has been a major factor in the sharp increase of value per ton, over recent years.

In 1982, the solid bleached sulfate and clay-coated boards together held a 75% share of all ton-

**F-4 — Folding Carton Employees & Plant Investment**

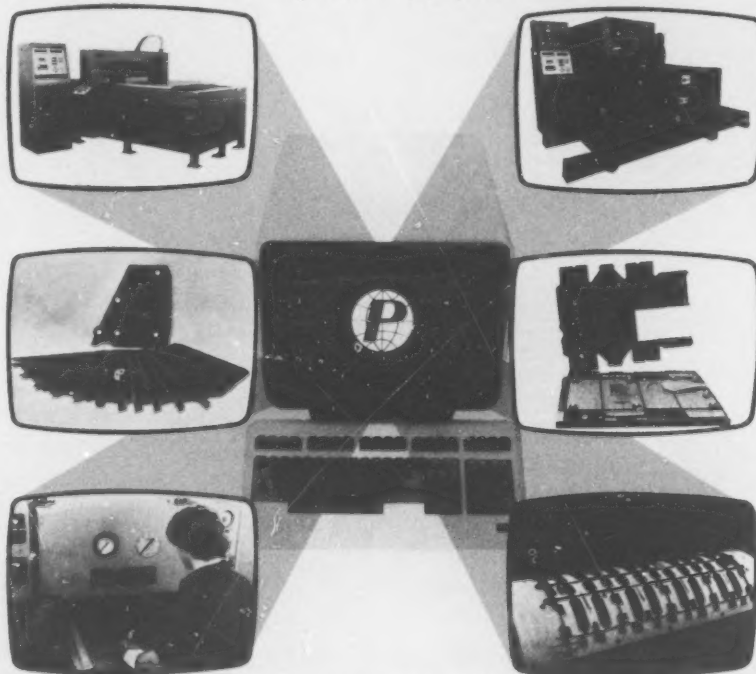
| Year | Estimated Number of Employees | Estimated Capital Investment |
|------|-------------------------------|------------------------------|
| 1952 | 42,700                        | \$211,200,000                |
| 1962 | 57,100                        | 373,100,000                  |
| 1972 | 74,350                        | 730,191,000                  |
| 1973 | 75,820                        | 763,237,000                  |
| 1974 | 77,140                        | 797,395,000                  |
| 1975 | 78,120                        | 852,322,000                  |
| 1976 | 80,100                        | 874,417,000                  |
| 1977 | 80,600                        | 944,352,000                  |
| 1978 | 80,900                        | 996,291,000                  |
| 1979 | 79,400                        | 1,012,350,000                |
| 1980 | 78,100                        | 1,029,450,000                |
| 1981 | 75,600                        | 1,046,978,000                |
| 1982 | 74,300                        | 1,263,500,000                |

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nage entering into folding carton production, compared with 51% in 1960. However, this resort to "super-appearance" materials has not reversed the decline in carton fortunes, as witness the stagnation of converted tonnage. It may be that high cost of materials is again leading to use of less expensive boards.

Thus, in the relatively cheap materials decade of the '60s, consumed volume of solid bleached went up 57%, and clay-coated 47%. But in the dozen years since 1970, clay-coated tonnage has risen another 25%, while the solid bleached is down to its lowest volume of the period.

No wonder. In 1982, a ton of typical bleached board cost \$373 more than in '72—a 140% increase—while an adequately attractive white-lined recycled board went up only \$190. That differential is likely to carry great weight with box marketers in evaluating the sales appeal of their packages.

**Table F-4:** Estimated from industry reports, these data indicate that U.S. folding carton plants employed about 1300 fewer people in 1982 than in '81, because of continuing closing of small- and no-profit facilities.

Investment per employee reached \$17,000—up 82% from \$9820 in '72. The average U.S. citizen spent \$12.80 for folding cartons in 1982, up 101% from \$6.37 in '72, up 151% from \$5.09 in '62, and up 187% from \$4.46 in 1952.

The average U.S. folding carton industry employee, including office personnel, represented \$39,730 in converted shipments, up by 122% from \$17,900 in 1972, and by 13% from \$16,695 in 1962.

Circle No. 164 on Reader Inquiry Card

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## Statistics *continued*

**Table F-5:** The number of producing U.S. folding carton plants and of operating companies decreased in 1982 for the sixth consecutive year, according to our *Official Container Directory* records.

No new carton plants opened during the year, for what appears to be the first time in industry history. A total of 12 plants was closed, and nine individual companies left the scene. Since the 1977 high point of the industry, 73 plants have closed, and 51 companies disbanded.

This reduction in plant numbers is offset, however, by a notable increase in average converting capability. At mid-1982, the industry's capacity for cutting/creasing—a basic indicator of carton operations size—was 67% higher than it had been 10 years earlier. During that decade, investment per average plant went up 79%, and its shipments value 129%.

## Composites Gain High-Volume Market Success

### Composite Can/Tube/Core Review

**Table G:** This newest of the paperboard packaging types provides perhaps the best illustration of the versatility of processed fibre products in competing with "natural" materials such as metals and wood.

The composites, designed to resist high stress from within and without, and with high resistance to entry or exit of moisture, gases,

## G—Composite Can, Tube and Core Commercial Production

(Millions of dollars, captive production not included)

Estimates by Composite Can and Tube Institute, Washington, D.C.

| Year | All Products | Composite Cans | Products other than Cans* |
|------|--------------|----------------|---------------------------|
| 1952 | 121.4        | 63.9           | 57.5                      |
| 1962 | 171.8        | 86.5           | 85.3                      |
| 1972 | 465.5        | 246.4          | 219.1                     |
| 1973 | 502.2        | 280.6          | 221.6                     |
| 1974 | 560.4        | 332.8          | 227.6                     |
| 1975 | 644.3        | 387.8          | 256.5                     |
| 1976 | 727.5        | 421.8          | 305.7                     |
| 1977 | 783.3        | 449.5          | 334.3                     |
| 1978 | 840.4        | 474.2          | 366.2                     |
| 1979 | 900.0        | 488.8          | 411.2                     |
| 1980 | 934.1        | 514.4          | 419.7                     |
| 1981 | 1,021.0      | 555.3          | 465.7                     |
| 1982 | 1017.2       | 565.0          | 452.2                     |

\*Includes tubes, cores and miscellaneous specialties.

and odors, have entered successfully in a variety of high-volume end uses.

For that reason, it is misleading to assess the modest sales increase of 1.7% in 1982 from '81 as reflecting a mediocre year, far from the average annual improvement in a total increase of 130% since 1972, of 550% since '62, and of 780% since 1952.

Actually, the minimal increase in '81-82 is a reflection of the virtually complete takeover by composite fibre cans in some applications. A high-volume example is the one-quart motor oil can. Another is the compact composite can for juice concentrates—a package that is produced in tens of billions per year.

Thus, the modest sales expansions of recent years connote a saturation of markets, rather than a slack-off.

Two other major matters concerning the sale of composite fibre cans are also reported by the Composite Can and Tube Institute. One is that the production of these cans in "captive" plants, for the pro-

ducer's own use, is estimated at roughly 10% in addition to the total shown here. Second is that recent years' sales have been greatly affected by the drop in demand for military ammunition containers.

It also may be noted that the composite cans are not thoroughly into some applications that were scarcely to be expected. Among these are the high-volume food and wearing apparel sectors.

In the "other than cans" area, one brilliant success example is a virtual takeover of the textile and related industries applications for reels, rolls, bobbins, spools, mandrels, and the like. These are being made with crush-resistance greater than that of equal-weight steel, to operating accuracies within thousandths of an inch. Overall, these improved composites offer the greatest versatility range of any form in the fibre-product field.

Space limitations necessitate that Paperboard Packaging continue two segments of the Statistical Review (*Fibre Drums and Rigid Boxes*) next month. □

## F-5 — Folding Carton Plants, Machines & Capacity

|                                   | 1952    | 1962     | 1972     | 1978     | 1979     | 1980     | 1981     | 1982     | 1983     |
|-----------------------------------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| Plants                            | 599     | 610      | 701      | 743      | 737      | 723      | 711      | 691      | 679      |
| Companies                         | 435     | 466      | 503      | 527      | 517      | 508      | 501      | 485      | 476      |
| No. Platen Cutters & Creasers     | 1,839   | 1,465    | 1,443    | 1,514    | 1,519    | 1,521    | 1,502    | 1,488    | 1,474    |
| No. Cylinder Cutters and Creasers | 1,852   | 2,085    | 2,326    | 2,441    | 2,442    | 2,439    | 2,440    | 2,432    | 2,424    |
| No. Blankers — Web fed            | 186     | 226      | 279      | 339      | 335      | 330      | 319      | 313      | 307      |
| No. Blankers — Sheet fed          | 31      | 55       | 390      | 565      | 590      | 608      | 602      | 574      | 556      |
| MM sq in./hr Capacity             | 8,660.8 | 12,412.4 | 18,845.4 | 29,543.0 | 31,167.9 | 31,250.8 | 31,320.6 | 30,959.9 | 30,487.1 |
| MM sq in. Capacity/hr/plant       | 15.28   | 30.35    | 26.88    | 39.76    | 42.29    | 43.22    | 44.05    | 44.80    | 44.90    |



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OCTOBER 1983 VOLUME 68, NO. 10

## On the Cover:

An office worker typing data with a word processor indicates what this issue is mostly about—computers. Our cover story, on software innovations at a Virginia folding carton plant, begins on page 19.



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## INDUSTRY STATISTICS

## by Fred Sharring

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A recently unveiled flexo folder-gluer does the job once performed by two machines.

EQUIPMENT IN USE

A New England specialty-items plant has wrapped as many as 120 cases a minute.

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December: 1984 Calendar  
January: Buying Forecast

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**Paperboard Packaging**  
7500 Old Oak Boulevard, Cleveland, OH  
44130 □ 216-243-8100 □ Telex: 968918  
111 E Wacker Drive, Chicago, IL 60601  
□ 312-938-2351  
757 Third Avenue, New York, N.Y.  
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N.Y. 10017 □ 212-888-3898 □ Telex: 968918  
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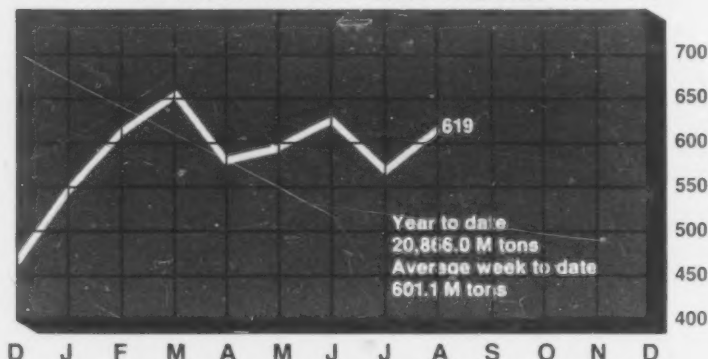
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## INDUSTRY STATISTICS

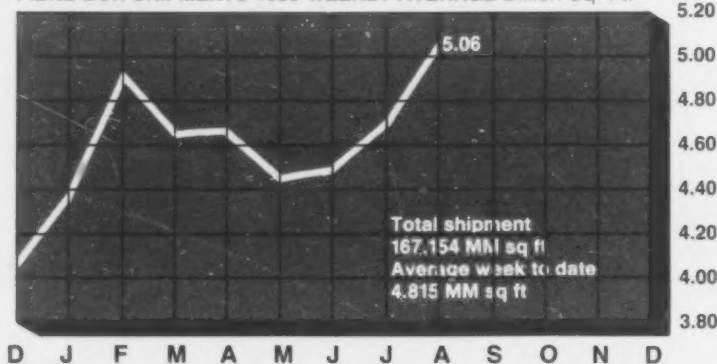
PAPERBOARD PRODUCTION 1983-WEEKLY AVERAGE 1 000 Tons



### PAPERBOARD MILL OPERATIONS:

The first two-thirds of 1983 ended with an average-week board output 7.4% above the previous year's level, compared with a drop of 9.8% in 1982 from 1981, and a rise of 3.8% in '81 from '80, a drop of 0.7% in '80 from '79, and a rise of 3.1% in 1979 over '78. In short, this trend illustrates the "averaging out" of industry expansion; a year or two of production growth followed by one or two of decrease, and now and then an "average" compensating year. However, an expanding margin of output suggests that the present strength will continue in '83.

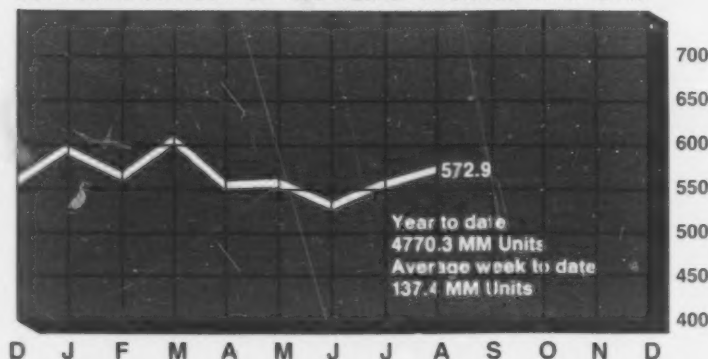
FIBRE BOX SHIPMENTS 1983-WEEKLY AVERAGE Billion Sq. Ft.



### PAPERBOARD-TYPE PRODUCTION:

In August, total board volume of 2742.0 M tons—up 11% from last year—comprised 2039.4 M of containerboards—up 13.7%—and 702.6 M of boxboards—3.9% up—as projected on historical basis from the American Paper Institute's "production by furnish" reports. This depicts the relatively high vigor of containerboard grades in a resurging market, though the boxboards also are well above an average annual advance. A more realistic comparison is with the "normal" year of 1981—August-end volume is up 1% from '81.

COMPOSITE CAN OUTPUT 1983-WEEKLY AVERAGE Million Units



### RIGID PAPER BOXES:

A satisfactory performance during and after what normally is the summer doldrums brought set-up box business into the final third of 1983 with overall billings some 10% ahead of last year, and with each of the National Paperbox & Packaging regions reporting some improvement. However, the geography effect continues to produce variations ranging from well above 100% in some local sectors to deep double-digit drops in others, where recession remains. However, this veteran box form shows an averaging out, over the years, in its regional business fortunes.

Statistical Review concludes with  
a close look at Fibre Drums and Rigid Boxes

## 1983 Is Mixed Bag Of Ups and Downs

by Fred Sharring  
Senior Editor  
Paperboard Packaging  
Editor  
Official Board Markets

### Fibre Drum Value Grows

#### Fibre Drum Review

**Table H:** Gains over 1981 in both total of units produced (9.6%) and value per unit (12.9%) brought the 1982 fibre drum value far above \$400 million—a gain of 24% from '81 and of 268% in the decade.

Some 70% of this decade's improvement in value has come during its second half—since 1977. While a good part of this current-dollar rise reflects inflation, the increase in unit production, 66% since 1972, indicates that research has been productive in design ver-

H—Growth of the Drum Industry

| Year | Estimated Million Drums | Estimated Average Price per drum | Estimated Dollar Equivalent |
|------|-------------------------|----------------------------------|-----------------------------|
| 1962 | 24.5                    | \$2.01                           | 49,143,000                  |
| 1962 | 32.7                    | 2.29                             | 74,888,000                  |
| 1972 | 48.1                    | 2.72                             | 130,832,000                 |
| 1973 | 50.9                    | 2.83                             | 143,915,000                 |
| 1974 | 56.8                    | 2.94                             | 167,149,000                 |
| 1975 | 46.6                    | 2.96                             | 137,936,000                 |
| 1976 | 50.7                    | 3.17                             | 160,719,000                 |
| 1977 | 54.6                    | 3.41                             | 186,190,000                 |
| 1978 | 59.0                    | 3.63                             | 226,074,000                 |
| 1979 | 64.0                    | 4.21                             | 269,440,000                 |
| 1980 | 69.4                    | 4.80                             | 333,120,000                 |
| 1981 | 72.9                    | 5.33                             | 388,557,000                 |
| 1982 | 79.9                    | 6.02                             | 480,998,000                 |

satility and new applications.

These include wide acceptance in, for example, the growing field of powdered-metal usages, and in advanced features for safe transport of inflammables, explosives,

toxics, and other hazardous materials.

Precise statistics on end uses for fibre drums are not compiled by any official industry agency. However, an informed recent estimate of categories is: chemicals 42%; food and related products 17%; plastic resins 16%; pharmaceuticals 7%; detergents and soaps 6%; abrasives, metal powders, wire, stampings, and machine parts, 6%; rolled materials such as films 2%; and all other products 4%.

### Rigid Box Sales Value Stays High, Tonnage Plummets

#### Rigid Box Review

**Tables I-1 and I-2:** In 1982, this oldest of the paper box species reached its second-highest sales value, and its lowest production tonnage, in modern history. Total value was down 6.1% from '81 but up 69% from '72. Board tonnage consumed (see Table D-1) was down 5.3% from the year earlier, and by 51% in the 10 years.

It is unlikely that any other packaging form has ever been faced with yielding 85% of its largest single end-use (textiles, apparel, and hosiery) to competitors within a single decade. Fewer could have maintained and expanded total sales value while doing it. But the venerable set-up box seems to have managed that.

Another unique aspect of the rigid box industry is that its output

I-1—Rigid Box Industry Sales

|                                     | (Percentage distribution by end use) |      |      |
|-------------------------------------|--------------------------------------|------|------|
|                                     | 1962                                 | 1972 | 1982 |
| Textiles, Apparel & Hosiery         | 23.05%                               | 8.7% | 3.3  |
| Department Stores & Specialty Shops | 13.58                                | 14.7 | 5.6  |
| Cosmetics & Soap                    | 6.42                                 | 6.7  | 1.4  |
| Confections                         | 11.47                                | 8.6  | 16.6 |
| Stationery & Office Supplies        | 6.21                                 | 5.9  | 17.1 |
| Jewelry & Silverware                | 5.14                                 | 9.2  | 10.0 |
| Photographic Products & Supplies    | 3.65                                 | 1.5  | 4.5  |
| Shoes & Leather                     | 2.78                                 | 7.2  | 0.3  |
| Drugs, Chemicals & Pharmaceuticals  | 4.37                                 | 7.7  | 8.3  |
| Toys & Games                        | 2.92                                 | 3.9  | 2.9  |
| Hardware & Household Supplies       | 3.18                                 | 4.2  | 7.5  |
| Food & Beverages                    | 1.41                                 | 1.0  | 1.4  |
| Sporting goods                      | 1.06                                 | 2.0  | 0.4  |
| Others & Misc. Customers            | 14.70                                | 18.7 | 22.7 |

is being achieved in a tremendously reduced number of producing plants. At the "high tide" point of some 25 years ago, around 800 separate rigid-box plants were listed in our *Official Container Directory*. These have now been consolidated to a total of 365, producing set-up boxes of greater value than ever before, though consuming much less board in manufacture.

One reason for this expanding vitality has been the increasing economic strength of the remaining producers, who inherit a broader "consumer unit base" in their use of advanced equipment and techniques.

The reduction in tonnage consumption of board may be attributed in large part to wider use of accessory materials, such as E-flute corrugated, plastic inserts, lightweight folding boxboard grades, and the like. These, in turn, have helped to offset increased costs of making and shipping the low-density box products. As industry sales have grown, the average size of company has also increased. The former typical small

#### I-2—Annual Dollar Sales

| Year | Dollar Sales Year to Year<br>(in millions) (% Change) |       |
|------|-------------------------------------------------------|-------|
| 1952 | 259.0                                                 | ± 0.4 |
| 1962 | 209.5                                                 | + 3.8 |
| 1963 | 314.8                                                 | + 1.7 |
| 1964 | 322.3                                                 | + 2.4 |
| 1965 | 347.3                                                 | + 7.8 |
| 1966 | 385.7                                                 | +11.0 |
| 1967 | 394.9                                                 | + 2.4 |
| 1968 | 421.8                                                 | + 6.8 |
| 1969 | 436.5                                                 | + 3.5 |
| 1970 | 433.9                                                 | - 0.6 |
| 1971 | 411.4                                                 | - 5.2 |
| 1972 | 437.7                                                 | + 6.4 |
| 1973 | 485.0                                                 | +10.8 |
| 1974 | 536.9                                                 | +10.7 |
| 1975 | 483.2                                                 | -10.0 |
| 1976 | 556.1                                                 | +15.5 |
| 1977 | 602.3                                                 | + 8.3 |
| 1978 | 653.0                                                 | + 8.4 |
| 1979 | 707.9                                                 | + 8.4 |
| 1980 | 738.3                                                 | + 4.3 |
| 1981 | 787.8                                                 | + 6.7 |
| 1982 | 739.4                                                 | - 6.1 |

producer, inclined to keep business local, has either closed his operation or merged to form larger and better-financed units. At the same time, the great majority of set-up box plants in this country are independently owned and operated—as distinct from the folding carton and corrugated areas, where about 85% of total conversion is in integrated facilities.

Further, rigid-box producers have been aggressive and ingenious in developing many variations on their products, while still meeting demands of new and old markets.

The sequence of end-use distribution in Table I-1 was tabulated originally in the order of highest to lowest percentage of sales. The list now bears little or no resemblance to that order, as new areas of market opportunity were developed, and others declined, because of the newer techniques of retail marketing in "visual display" packaging, such as the transparent plastics. These characteristics of product versatility and producer ingenuity are reflected in the continuing success of the set-up box. □

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